FPC-7300 / FPC-7302

Fanless Intel Socket P Core™ 2 Duo Box PC

User's Manaul

Version 1.1

P/N: 4012730001110P

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Copyright Notice

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FCC Class A

This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference installations. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Move the equipment away from the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/television technician for additional suggestions

You are cautioned that any change or modifications to the equipment not expressly approved by the party responsible for compliance could void Your authority to operate such equipment.

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. Disconnect this equipment from the A/C outlet before cleaning it. Use a moist cloth. Do not use liquid or sprayed detergent for cleaning.
7. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. If the equipment will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
10. Never pour any liquid into opening. This may cause fire or electrical shock.
11. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
12. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped or damaged.
    f. The equipment has obvious signs of breakage.
13. The sound pressure level at the operator's position, according to IEC 704-1:1982, is no more than 70dB(A).
14. Keep this User’s Manual for later reference.

About This User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing the Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion. The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.
Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at:

ftp://ftp.arbor.com.tw/pub/manual

Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://www.arbor.com.tw
E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantibility and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Ordering Information

FPC-7300/FPC7302	Barebone system w/o storage device, CPU, memory
PAC-B120W	120W AC/DC adapter kit
DRK-001	DIN rail kit for FPC series
WMK-7000	Wall-mount kit of FPC-7XXX
CBL-7100-COM	COM converter cable (1*44-pin female to 4*DB9 male + 1*DB9 female) L=200mm
SSD-25080	Intel® 2.5" 80GB SATAII SSD kit

Chapter 1

General Information

1.1 Introduction

Both Box PCs, FPC-7300 and FPC-7302, are targeted at many different application fields. By adopting it, you can pinpoint specific markets, such as Thin Client, KIOSK, information booth, GSM Server, environment-critical and space-critical applications.

- **All-In-One Platform**
  The CPU, DRAM and even software are integrated to provide a plug-and-play machine.
- **Compact-sized**
  The kernel of FPC-7300 / FPC-7302 is FMB-i45M3, which is a non-standard form factor embedded board. The whole system consumes only a few space.
- **Fanless and Modular CPU Board**
  By using a low power processor, the system does not have to rely on fans, which are often unreliable and cause dust to circulate inside the equipment. The modular design facilitates maintenance or possible upgrades on the CPU board. Modular Box PC can be easily modified to fit many different applications according to customers' requests.
- **Powerful Communication Capability**
  The FPC-7300 / FPC-7302 provides COM, LPT, Ethernet, USB, Mini Card slot, DVI and Digital I/O expansion slot.
- **Numerous Display/Video Output**
  With Mobile Intel® Graphics Media Accelerator 4500MHD graphics core embedded, FPC-7300 / FPC-7302 improves graphics and 3D rendering performance and supports numerous display/video output options includes VGA, DVI, S-Video/Composite Video and DisplayPort.
- **Advanced Storage Solution**
  FPC-7300 / FPC-7302 comes with Compact Flash slot, which offers a better, faster and more cost-effective expansibilities for various applications.
- **Trustworthy**
  The onboard Watchdog Timer can invoke an NMI or system RESET when your application loses control over the system.

1.2 Packing List

After opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, please contact with your local dealer or distributor. The package should contain the following items:

Standard:

- 1 x FPC-7300 / FPC-7302 Box PC
- 1 x Accessory Box
  (Driver CD/User's Manual/Screws/Cable/Terminal Block)

Options:
The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not to carry all the items.

- AC/DC Adapter Kit
- DIN Rail Kit
- Wall-mount Kit
- COM Converter Cable (1x44-pin male to 4xDB9 male + 1xDB9 female) L=200mm

1.3 The Installation Paths of CD Driver

Windows 2000 & XP

Driver	Path
CHIPSET	\CHIPSET\INTEL\INF 9
VGA	\GRAPHICS\INTEL_2K_XP_32\1436
LAN	\ETHERNET\REALTEK\8111B_WIN5698
AUDIO	\AUDIO\REALTEK_HD\WINDOWS_R198

Windows Vista

Driver	Path
CHIPSET	\CHIPSET\INTEL\INF 9
VGA	\GRAPHICS\INTEL_VISTA_32\1598
LAN	\ETHERNET\REALTEK\VISTA_6206_0619
AUDIO	\AUDIO\REALTEK_HD\VISTA_R198

1.4 Specifications

System Kernel	
Processor	Intel Socket P (Penryn/Merom) Core™ 2 Duo/ Celeron M
FSB	667/800/1066 MHz
BIOS	AMI Flash BIOS
Chipset	Intel GM45 + Intel ICH9-M
Graphics	GMA 4500MHD
System Memory	• 2 x 200-pin SO-DIMM sockets • Dual-channel DDR2 667/800 • Support max. 4GB
Serial ATA	2 x SATA 300MB/s
Expansion Bus	1 x Mini-card slot 1 x PCI slot (FPC-7300) 2 x PCI slots (FPC-7302)
Ethernet Controller	2 x Realtek RTL8111C Gigabit Ethernet
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	• 4 x serial port via one DB-44 female connector • COM1 ~ COM3: RS-232 • COM4: RS-232/422/485
*Selectable Port	• 1 x DVI-D (equipped by default) • 1 x LPT • 1 x 16-bit Digital I/O (8-in/8-out)
USB Port	8 x USB 2.0 ports
LAN Port	2 x RJ-45
Video Port	1 x DB-15 for Analog RGB 1 x DisplayPort
KB/MS	1 x 6-pin mini-DIN for keyboard & mouse
TV-out	1 x 6-pin mini-DIN connector for S-Video output, or composite output via an external cable
Audio	Mic-in/Line-out (6W pre-amplified)
Storage	
HDD/SSD	1 x 2.5" drive bay for HDD or SSD

CF	1 x CompactFlash Type II slot (outside accessible)
Safety	
FCC	Class A certified
CE	Certified
Environment	
Operating Temp.	-20 ~ 55ºC (-4 ~ 104ºF), ambience w/ air flow
Storage Temp.	-40 ~ 85ºC (-40 ~ 185ºF)
Relative Humidity	10 ~ 95% @ 40ºC (non-condensing)
Vibration	1.5 grms/5 ~ 500 Hz/random operation
Shock & Crash	Operating 20G, 11ms; Non-operating 40G with **HDD**, 11ms Operating 40G, 11ms; Non-operating 60G with **CF/SSD**, 11ms Crash 80G, 11ms
Mechanical	
Construction	Aluminum alloy
Mounting	Wall mounting and DIN rail mounting
Weight	FPC-7300: 3.9 kg (8.6 lb) FPC-7302: 4.2 kg (9.24 lb)
Dimensions (W x D x H)	FPC-7300: 195 x 268 x 80 mm (7.68" x 10.55" x 3.15") FPC-7302: 195 x 268 x 100 mm (7.68" x 10.55" x 3.93")

* ***The selectable ports, including DVI-D, LPT and Digital I/O, are options that only one of which can be equipped.***

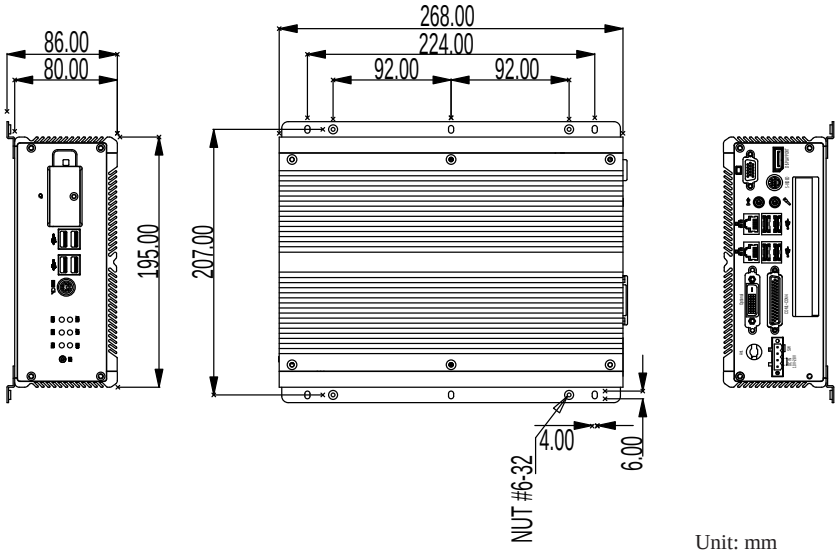
1.5 Power Information

Power Connector	1 x 4-pin DC input receptacle combined with a power on/off switch for remote control
Input Voltage	DC 10 ~ 28V
Power Consumption	60W (Max.)

1.6 Dimensions

FPC-7300

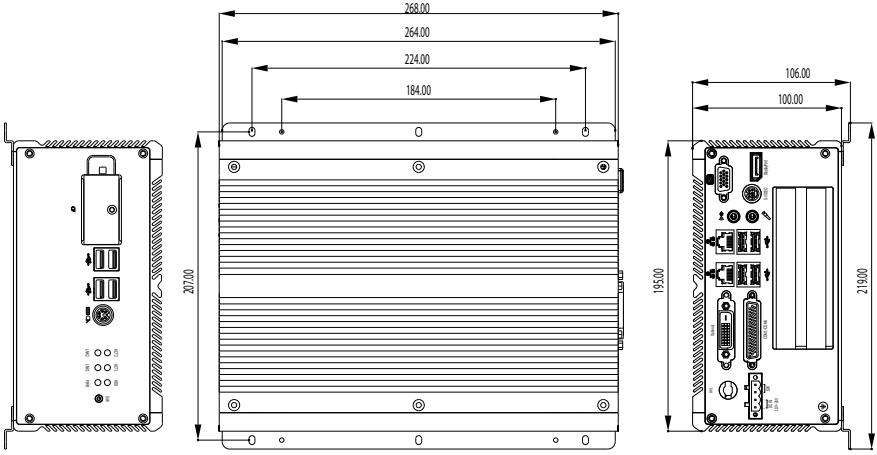
- Dimension (W x D x H): 195 x 268 x 80 mm (7.68" x 10.55" x 3.15")



Unit: mm

FPC-7302

- Dimension (W x D x H): 195 x 268 x 100 mm (7.68" x 10.55" x 3.94")



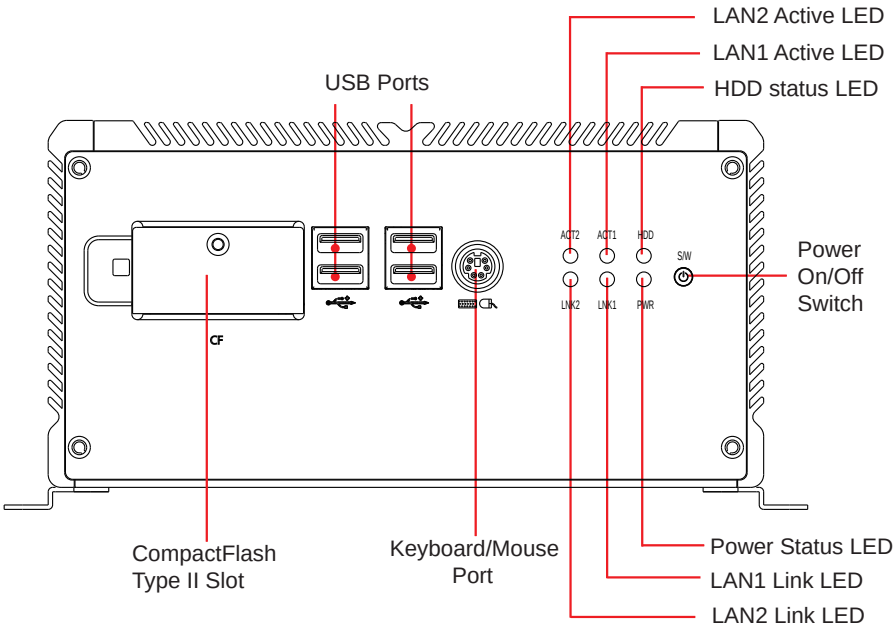
Unit: mm

1.7 Locating Controls and Connectors

Both FPC-7300 and FPC-7302 have the same I/O ports and connectors at the front panel.

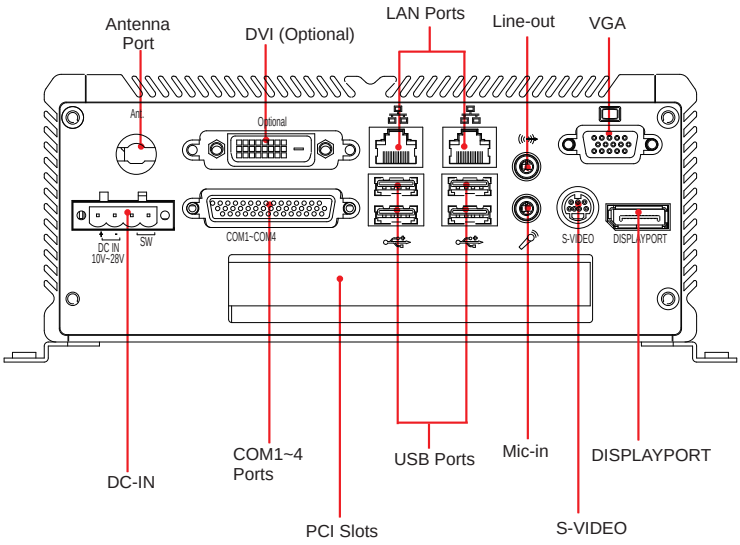
Please take a moment to identify those controls and connectors shown in the following figures.

Front panel

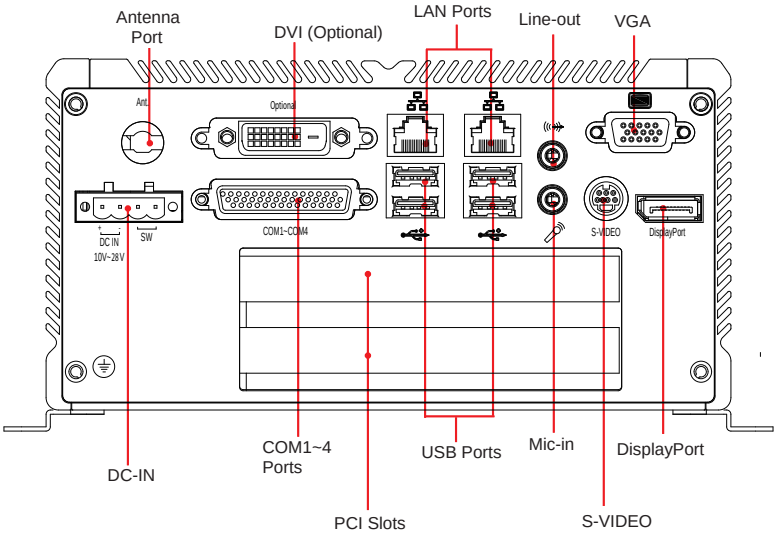


Rear panel

FPC-7300



FPC-7302



1.8 Connecting Peripherals

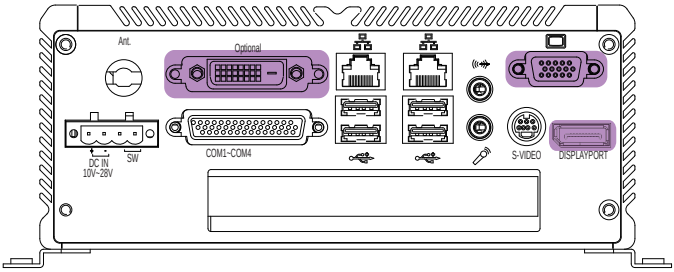
The user can use the I/O interfaces located at the rear side of the chassis to connect to external peripheral devices, such as a mouse, a keyboard, a monitor, serial devices or parallel printer, etc. Before connection, make sure that the computer and the peripheral devices are turned off.

1.8.1 VGA/DVI/DisplayPort Video Outputs

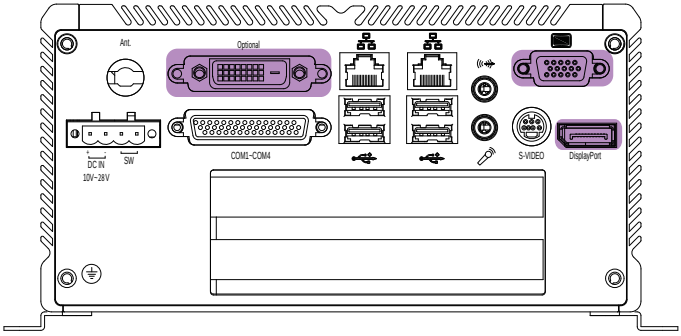
Both FPC-7300 and FPC-7302 are equipped with three video outputs—one 15-pin VGA, one DisplayPort and one optional DVI (comes with the unit by default) located at the rear side of the chassis for multiple display connections.

The new DisplayPort video interface features small USB sized connector, long cable support especially for digital projectors or remote displays, WQXGA High Definition (2560 x 1600), interoperability with DVI and HDMI over DisplayPort connector, etc.

FPC-7300



FPC-7302

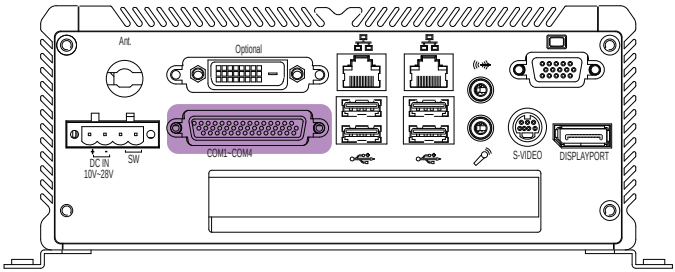


1.8.2 Serial Ports (COM1 ~4)

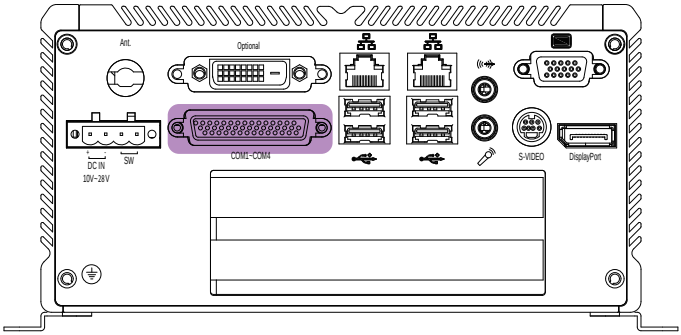
Both FPC-7300 and FPC-7302 are built with an integrated serial ports that combines COM1 ~ COM4 into a D-sub 44-pin female connector. Each port supports RS-232; in addition, COM4 supports RS-232/422/485 selectable.

To connect to any serial device, follow the steps below:
1. Turn off the BOX PC system and the serial devices.
2. Attach the interface cable of the serial device to the serial connector. Be sure to fasten the retaining screws.
3. Turn on the computer and the attached serial devices.
4. Refer to the serial device's manual for instructions to configure the operation environment to recognize the new attached devices.
5. If the serial device needs specified IRQ or address, you may need to run the CMOS setup to change the hardware device setup.

FPC-7300



FPC-7302

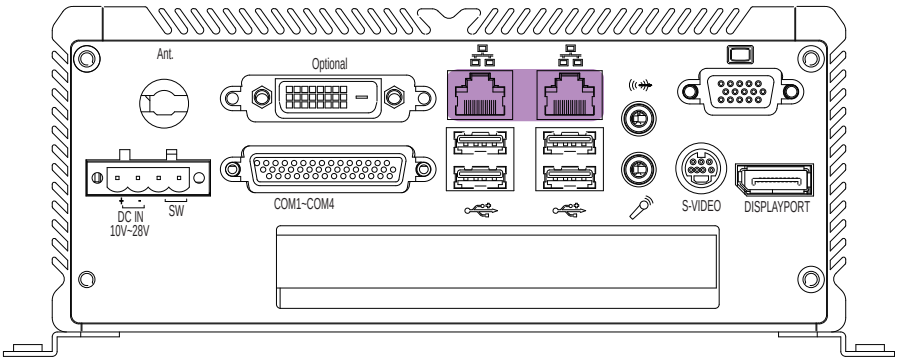


1.8.3 LAN Ports

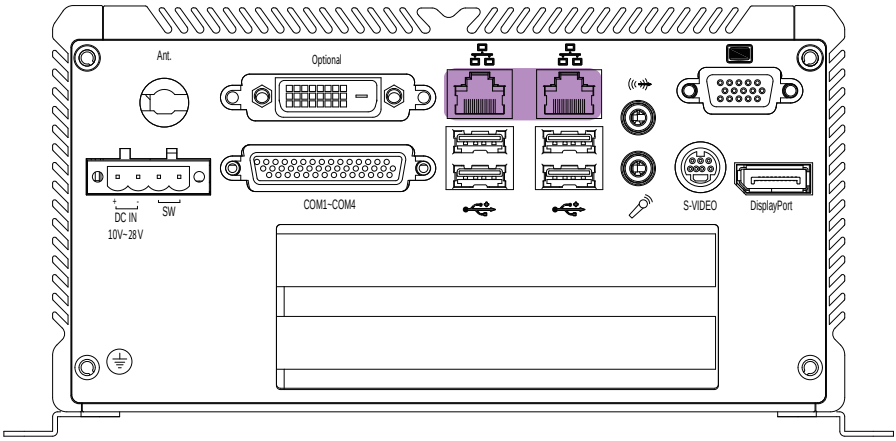
Both FPC-7300 & FPC-7302 provide two Realtek 8111C 10/100/1000Base-T Ethernet (RJ-45) interface. For network connection, follow the instructions below:

1. Turn off the BOX PC system and the Ethernet hubs.
2. Plug in one end of cable of a 10/100/1000Base-T hub to the system's RJ-45 jack.

FPC-7300



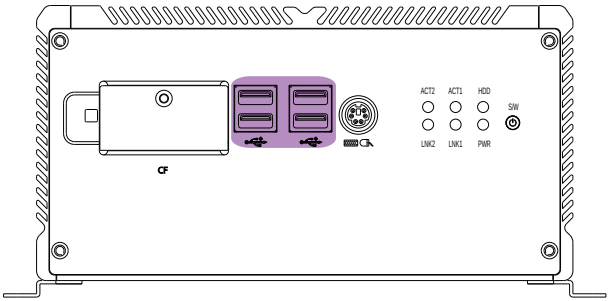
FPC-7302



1.8.4 USB Ports

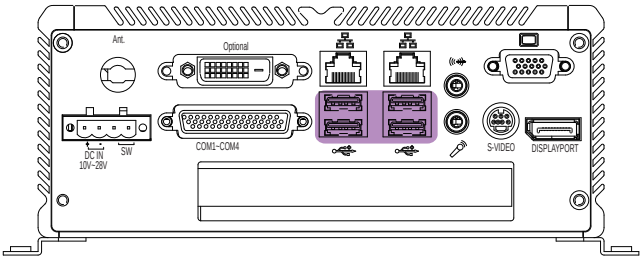
Both FPC-7300 & FPC 7302 have four USB ports on the front panel and four USB ports on the rear panel to connect to external USB devices. USB ports and devices are hot-pluggable. Therefore, any USB device can be connected at all time without turning off your system.

Front panel

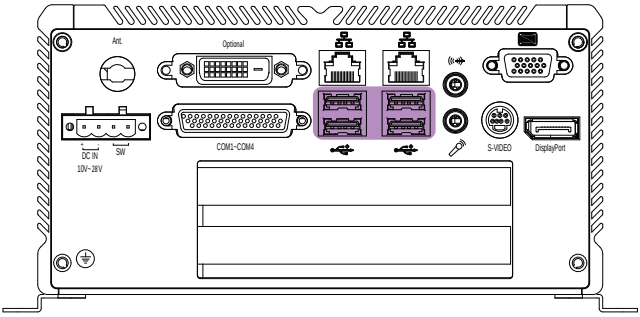


Rear panel

FPC-7300



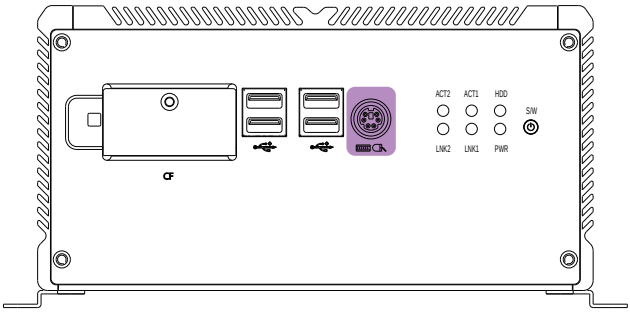
FPC-7302



Note that for many of these devices, you will first have to install proper device drivers before they can be recognized by the system.

1.8.5 Keyboard and Mouse

Both FPC-7300 & FPC-7302 have one PS/2 keyboard/mouse connector located at the front panel.

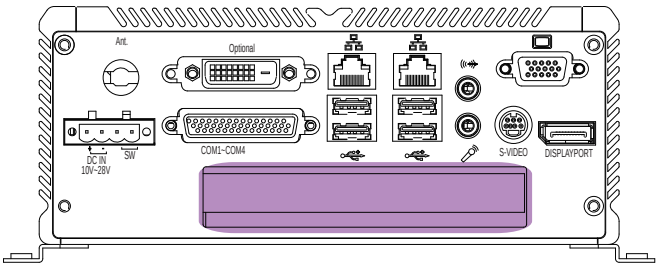


To connect an AT keyboard, an adapter between the PS/2 interface and the AT Keyboard is needed.

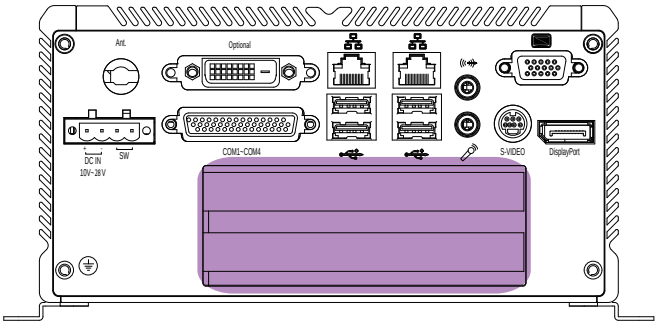
1.8.6 Expansion PCI Slots

FPC-7300 has one PCI slot located at the rear panel while FPC-7302 provides two.

FPC-7300



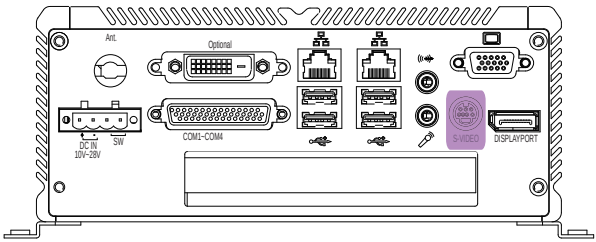
FPC-7302



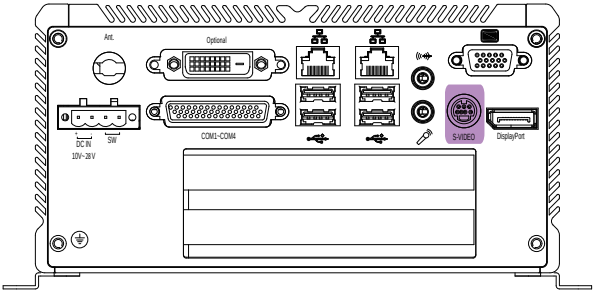
1.8.7 S-Video Connector

A 7-pin mini-DIN female connector for S-Video output, or composite output via an external cable.

FPC-7300



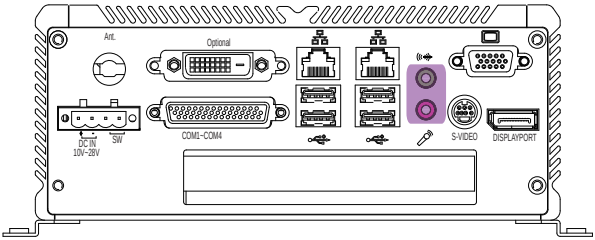
FPC-7302



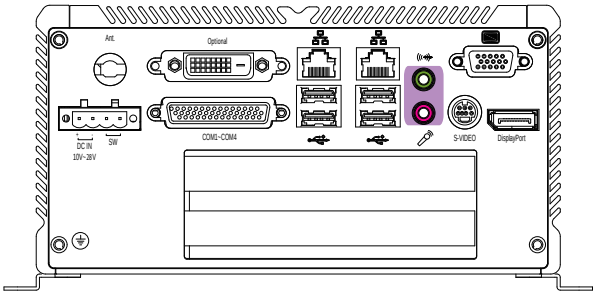
1.8.8 Audio Line-out/Mic-in

Two audio jacks for Line-out and Mic-in located at the rear panel.

FPC-7300



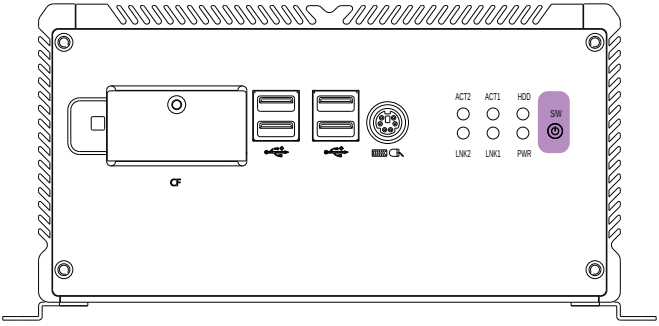
FPC-7302



1.8.9 DC Power Input and Power ON/OFF Button

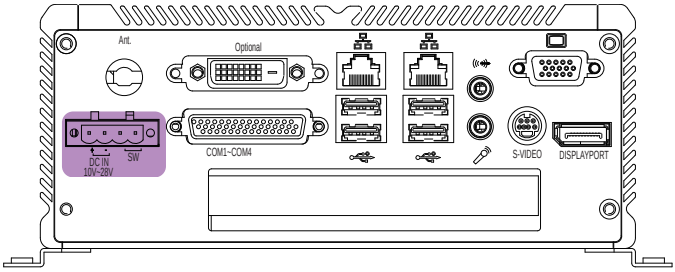
For DC power input, the computer is equipped with a 4-pin terminal block receptacle on the rear panel. The “S/W” button located on the front panel is used to power ON/OFF the computer. See the figures below.

Front panel

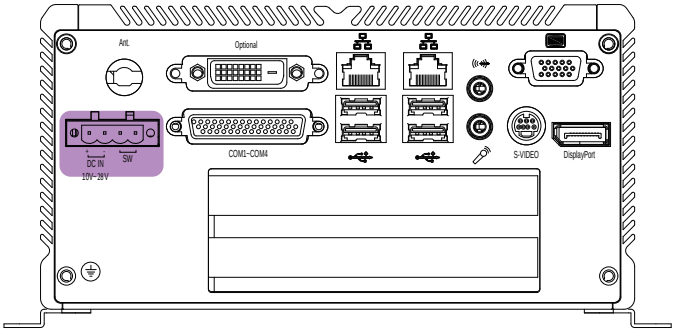


Rear panel

FPC-7300



FPC-7302



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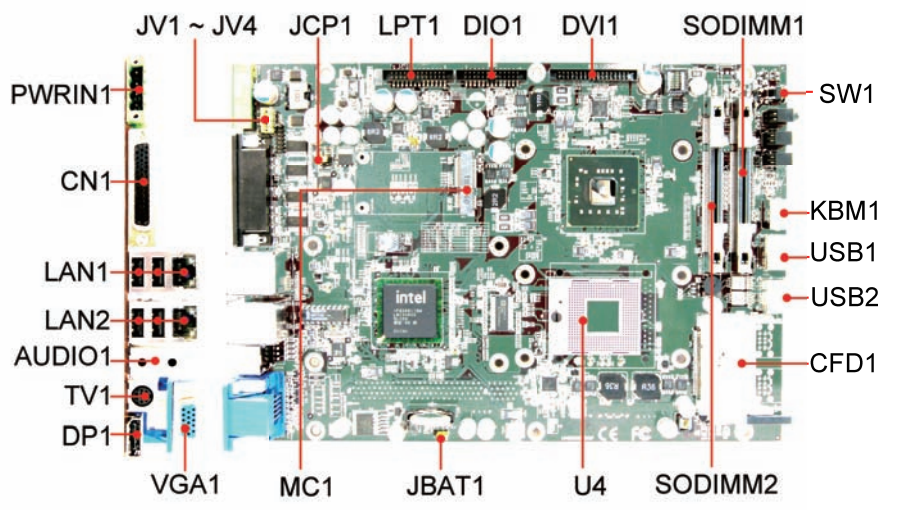
Chapter 2

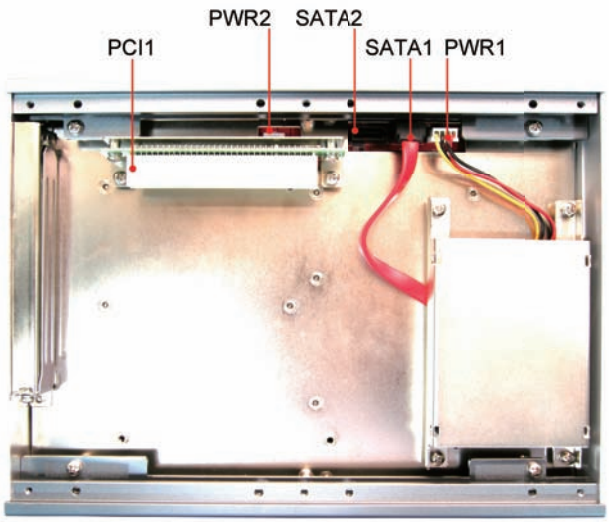
The Engine of FPC-7300/FPC-7302

2.1 Board Layout

The engine of FPC-7300 / FPC-7302 is constructed by the combination of one PCBA board. Such a combination makes system customization feasible.



Main Board Top View



FPC-7302 Bottom View

2.2 Jumpers and Connectors

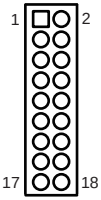
2.2.1 Jumpers & Connectors List

Label	Function
PWRIN1	4-pin DC input receptacle
CN1	Serial Port 1 ~ 4
LAN1	Ethernet connector (includes 2 USB connectors)
LAN2	Ethernet connector (includes 2 USB connectors)
AUDIO1	Audio jacks
TV1	S-Video/Composite output
DP1	DISPLAYPORT connector
VGA1	D-sub 15 Female connector
MC1	Mini card PCIE X1 Interface slot
JBAT1	CMOS clear jumper
U4	CPU socket
SODIMM2	200-Pin dual-channel DDR2 SO-DIMM slot
CFD1	CompactFlash Disk slot
USB2	2 USB connectors
USB1	2 USB connectors
KBM1	PS/2 Keyboard and Mouse connector
SW1	Power ON/OFF button
SODIMM1	200-Pin dual-channel DDR2 SO-DIMM slot
DVI1	DVI Display box header
DIO1	Digital I/O Connector
LPT1	Parallel Port
JCP1	COM port power selection
JV1 ~ JV4	Pin 9 selection for COM port
PCI1	32-bit PCI connector
SATA1/2	Serial ATA connectors
PWR1/2	HDD/SSD Power connectors

2.2.2 Jumper Setting

Label	Function	Jumper Settings
JBAT1	Clear CMOS	1-2: Keep CMOS (default) 2-3: Clear CMOS
JCP1	COM Port Power Selection	1-2: +5V (default) 2-3: +12V
JV1~JV4	RI/5V/12V (Pin 9) Selection for COM Port	1-2: RI (default) 2-3: 5V or 12V (depends on JCP1)

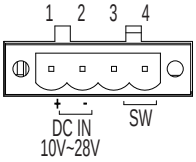
JPB1



Mode / Pin	RS-232	RS-422	RS-485
1-2	OFF	ON (Term.)	ON (Term.)
3-4	OFF	ON (Term.)	ON (Term.)
5-6	OFF	OFF	ON
7-8	OFF	ON	OFF
9-10	OFF	ON	ON
11-12	ON	OFF	OFF
13-14	OFF	OFF	ON
15-16	OFF	OFF	ON
17-18	OFF	OFF	ON

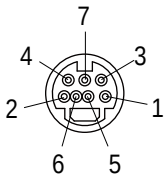
2.2.3 Pin Assignments for Connectors

PWRIN1 (Power Receptacle)
Power Input terminal block receptacle



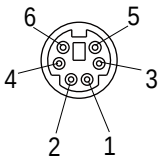
Pin	Description
1	DCIN_VCC
2	GND
3	+5VSB
4	EXT_PBTN#

TV1 (S-Video)
7-pin mini-DIN connector



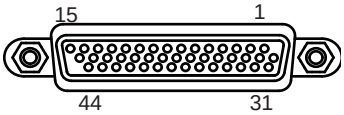
Pin	Description
1	GND
2	GND
3	VIDEO-Y
4	VIDEO-C
5	NC
6	NC
7	VIDEO-CVBS

KBM1 (Keyboard & Mouse)
PS/2 keyboard & Mouse connector



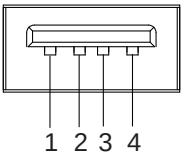
Pin	Description
1	KB_DAT
2	MS_DAT
3	GND
4	VCC5
5	KBCLK
6	MSCLK

CN1 (COM1 ~ COM4)
DB-44 female connector: serial port 1 ~ 4



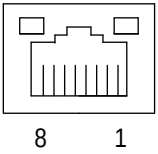
Pin	Description	Pin	Description
1	COM1_DCD#	23	COM3_TXD
2	COM1_RXD	24	COM3_DTR#
3	COM1_TXD	25	GND
4	COM1_DTR#	26	COM3_DSR#
5	GND	27	COM3_RTS#
6	COM1_DSR#	28	COM3_CTS#
7	COM1_RTS#	29	COM3_RI#
8	COM1_CTS#	30	GND
9	COM1_RI#	31	COM4_DCD#
10	GND	32	COM4_RXD
11	COM2_DCD#	33	COM4_TXD
12	COM2_RXD	34	COM4_DTR#
13	COM2_TXD	35	GND
14	COM2_DTR#	36	COM4_DSR#
15	GND	37	COM4_RTS#
16	COM2_DSR#	38	COM4_CTS#
17	COM2_RTS#	39	COM4_RI#
18	COM2_CTS#	40	GND
19	COM2_RI#	41	RX -
20	GND	42	RX +
21	COM3_DCD#	43	TX -
22	COM3_RXD	44	TX +

USB1/2 (USB Ports)
USB 2.0 type A connector



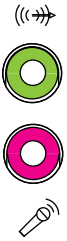
Pin	Description
1	VCC5
2	Data-
3	Data+
4	GND

LAN1/2 (LAN Ports)
RJ-45 connector



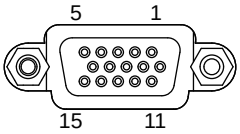
Pin	Description
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DB-
5	BI_DC+
6	BI_DC-
7	BI_DD+
8	BI_DD-

AUDIO1 (Audio Jacks)



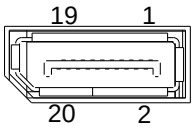
Jack	Description
Green	Line-out
Pink	Microphone

VGA1 (VGA Connector)
Three-row/15-pin VGA Connector



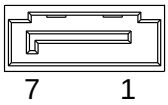
Pin	Description	Pin	Description	Pin	Description
1	RED	6	GND	11	N/C
2	GREEN	7	GND	12	VDDAT
3	BLUE	8	GND	13	HSYNC
4	N/C	9	VCC	14	VSYNC
5	GND	10	GND	15	VDCLK

DP1 (DisplayPort Connector)
Digital Audio/Video Connector



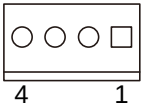
Pin	Description	Pin	Description
1	LANE_0P	11	GND
2	GND	12	LANE_3N
3	LANE_0N	13	GND
4	LANE_1P	14	GND
5	GND	15	GND
6	LANE_1N	16	COM3_CTS#
7	LANE_2P	17	AUX_N
8	GND	18	HPD
9	LANE_2N	19	RTN_PWR
10	LANE_3P	20	PWR

SATA1/2 (Serial ATA Connectors)
On-board Serial ATA connector



Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

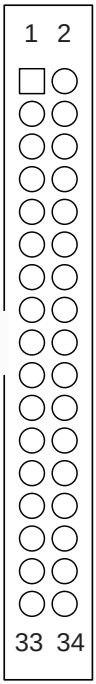
PWR1/2 (HDD/SSD Power Connectors)
On-board HDD/SSD Power connector



Pin	Description
1	VCC5
2	GND
3	GND
4	+12V

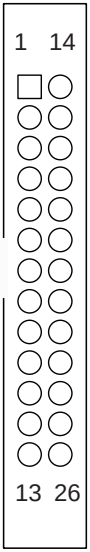
DVI1 (DVI)

On-board Digital Visual Interface Connector
Connector type: 2.00mm pitch 2x17-pin box header



Pin	Description	Pin	Description
1	Analog GND	2	Analog GND
3	T.M.D.S. Data2-	4	T.M.D.S. Data2+
5	GND	6	N/C
7	N/C	8	DDC Clock
9	DDC Data	10	N/C
11	T.M.D.S. Data1-	12	T.M.D.S. Data1+
13	Analog GND	14	N/C
15	N/C	16	+5V
17	Analog GND	18	Hot Plug Detect
19	T.M.D.S. Data0-	20	T.M.D.S. Data0+
21	Analog GND	22	N/C
23	N/C	24	GND
25	T.M.D.S. CLK+	26	T.M.D.S. CLK-
27	GND	28	GND
29	N/C	30	N/C
31	N/C	32	Analog GND
33	Analog GND	34	N/C

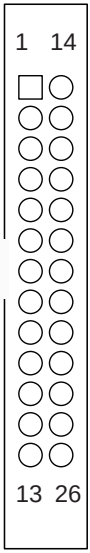
LPT1 (Parallel Port)
On-board Parallel Port Connector
Connector type: 2.00mm pitch 2x13-pin box header



Pin	Description	Pin	Description
1	XP_STB#	14	P_AFD#
2	XP_D0	15	P_ERR#
3	XP_D1	16	P_INIT#
4	XP_D2	17	P_SLIN#
5	XP_D3	18	GND
6	XP_D4	19	GND
7	XP_D5	20	GND
8	XP_D6	21	GND
9	XP_D7	22	GND
10	P_ACK#	23	GND
11	P_BUSY	24	GND
12	P_PE	25	GND
13	P_SLCT	26	N/C

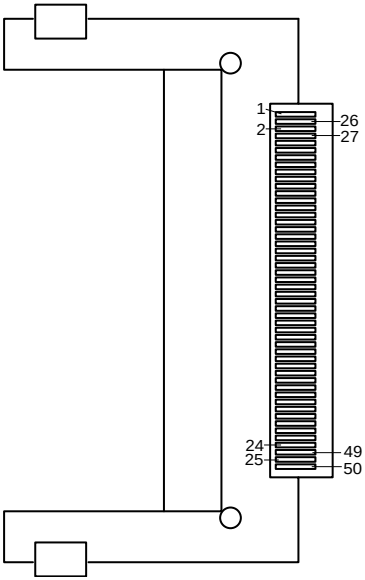
DIO1 (Digital I/O Port)

On-board Digital I/O Connector
Connector type: 2.00mm pitch 2x13-pin box header



Pin	Description	Pin	Description
1	DIO0	14	DIO1
2	DIO2	15	DIO3
3	DIO4	16	DIO5
4	DIO6	17	DIO7
5	DIO8	18	DIO9
6	DIO10	19	DIO11
7	DIO12	20	DIO13
8	DIO14	21	DIO15
9	VCC5	22	GND
10	VCC5	23	GND
11	N/C	24	N/C
12	N/C	25	N/C
13	N/C	26	N/C

CFD1 (CompactFlash Slot)
CompactFlash Disk Type II slot
Connector type: 50-pin CompactFlash Type I/II



Pin	Description	Pin	Description
1	GND	26	N/C
2	PDD3	27	PDD11
3	PDD4	28	PDD12
4	PDD5	29	PDD13
5	PDD6	30	PDD14
6	PDD7	31	PDD15
7	PDCS#1	32	PDCS#3
8	GND	33	N/C
9	GND	34	PDIOR#
10	GND	35	PDIOW#
11	GND	36	VCC5
12	GND	37	INTP
13	VCC5	38	VCC5
14	GND	39	CSEL
15	GND	40	N/C
16	GND	41	PCIRST#
17	GND	42	PIORDY
18	PDA 2	43	PDREQ
19	PDA1	44	PDACK#
20	PDA0	45	PATALED#
21	PDD0	46	P66DET
22	PDD1	47	PDD8
23	PDD2	48	PDD9
24	N/C	49	PDD10
25	N/C	50	GND

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Chapter 3

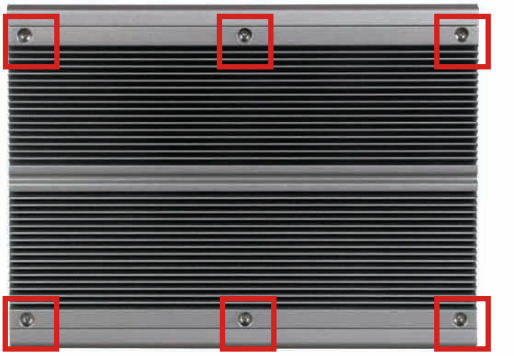
Installation and Maintenance

3.1 CPU and Memory Module Installation

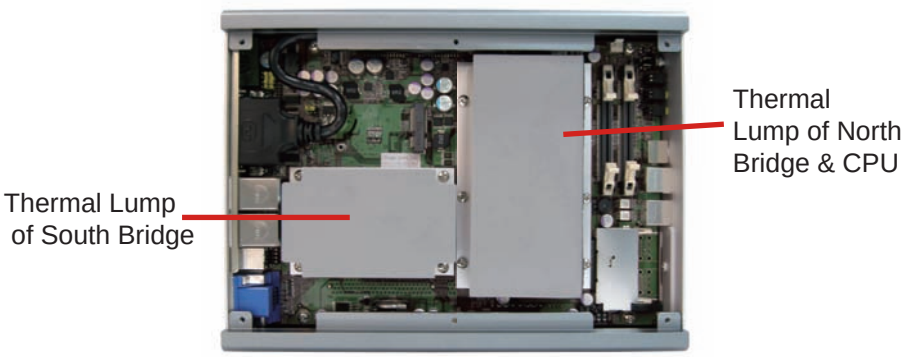
FPC-7300 / FPC-7302 is designed to be modular, slim and lightweight for easier maintenance. The following sections describe simple hardware installations.

3.1.1 Removing Top Cover

1. Locate the six screws which secure the top cover.

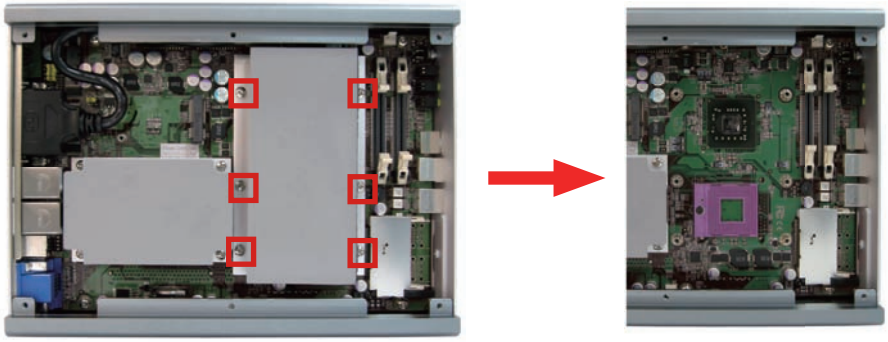


2. Use a screwdriver to remove the top cover screws. First unscrew the four screws in each corner, and then the two screws in the middle of the two sides. Keep the screws safely for later use. **(Note: Remember to first secure the two screws in the middle and then the two sides when you are to install the top cover.)**
3. Slightly pull the top cover upward.

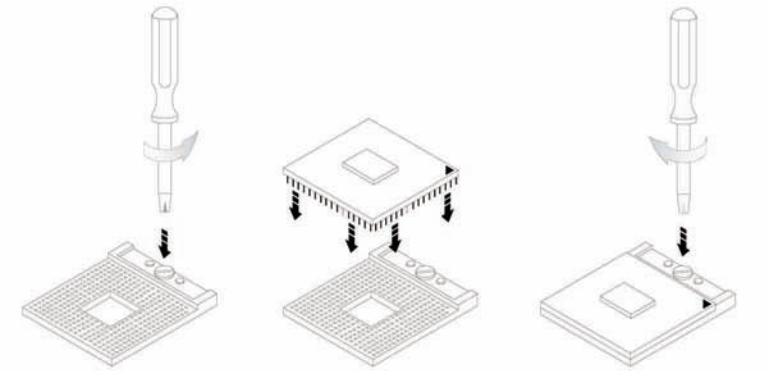


3.1.2 Installing CPU

1. Locate the six screws which secure the Thermal Lump.
2. Use a screwdriver to remove the six screws and keep them safely for later use.



3. The processor socket comes with a screw to secure the CPU. As shown in the picture below, loose the screw first before inserting the CPU.

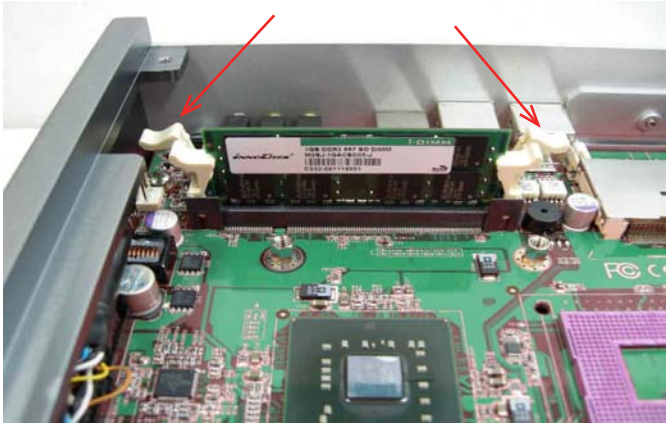


4. Place the CPU into the socket by making sure the notch on the corner of the CPU corresponding with the notch on the inside of the socket. Once the CPU is slid into the socket, lock the screw.
5. The contact area and gap between the processor and the heatsink require a thermal pad or thermal paste. Make sure that heatsink of the CPU top surface is in complete contact to avoid the CPU overheating problem. If not, it would cause your system or CPU to be hanged, unstable, or damaged.

3.1.3 Installing Memory Module

1. Locate the 200-pin SO-DIMM slots and press down the clips.
2. Align the SO-DIMM on the slot and let the notch on the SO-DIMM meet the break on the slot.
3. Hold the SO-DIMM with both hands, and gently insert the SO-DIMM into the slot until the clips of the SO-DIMM slot close to lock the memory module in place.

4. To remove the memory module, just press down the clips of the SO-DIMM slot with both your hands. And then the memory module will be lifted up for removing.



3.2 How to Access CF Card

1. Make sure you have turned off the power before inserting or ejecting the CF card (if OS is installed on CF card).
2. Locate the CF card door on the front panel.
3. Use a crosshead screwdriver (#1 tip) to remove the screw that secures the CF card door. Pull down the door.

4. Insert your CF card into the slot until it stays firmly in place. When it is done, the card ejection button pops up.

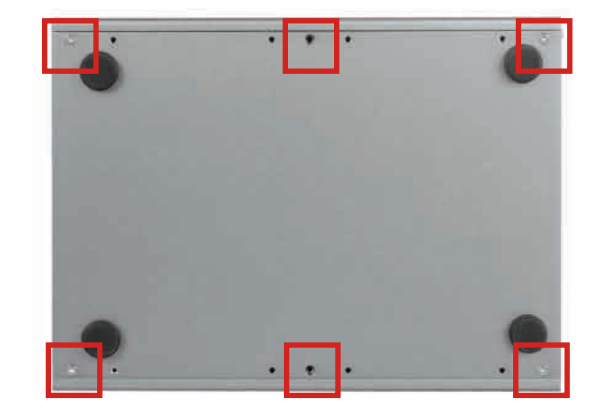
5. After inserting the CF card, close the card door and screw it on clockwise.

6. To remove thc CF card, follow steps 1, 2 and 3 above. And then press the ejection button inwards to pop up the CF card.

3.3 Hard Disk Drive and PCI Card Installation

3.3.1 Removing Bottom Cover

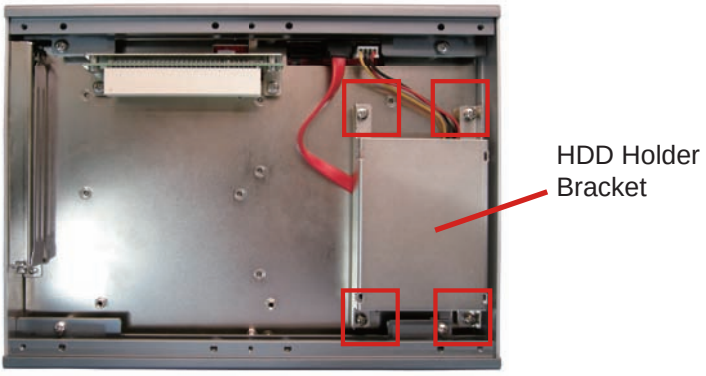
1. Place the Box PC upside down. Unscrew the six screws which secure the bottom cover.



2. Use screwdriver to remove the bottom cover screws and keep them safely for later use.

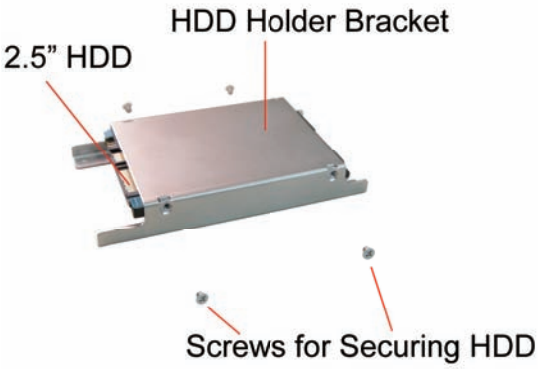
3.3.2 Installing Hard Disk Drive

1. Remove the Bottom Cover.
2. Locate the four screws securing the HDD Holder Bracket to the main unit.



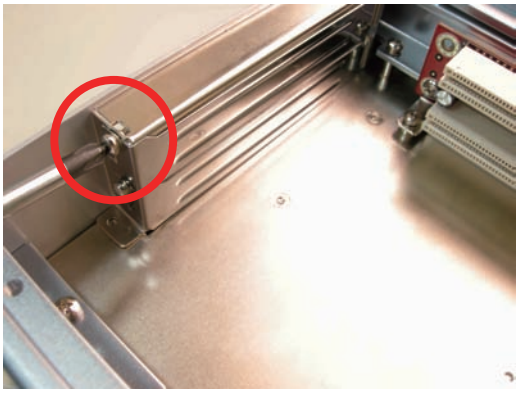
3. Unscrew the screws and remove the HDD Holder Bracket. Keep the screws safely for later use.

4. Put the HDD into the HDD Holder Bracket and screw it on.
5. Connect the SATA cable between the HDD and the Main Board.

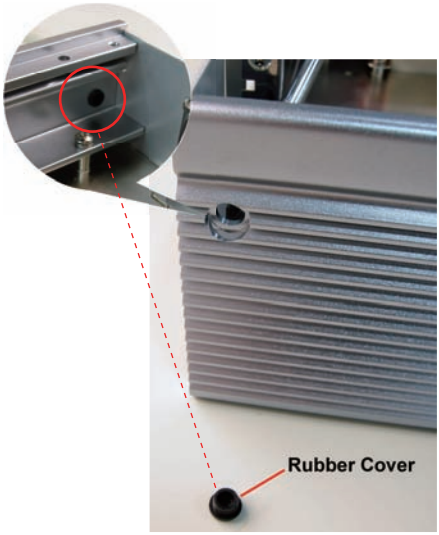


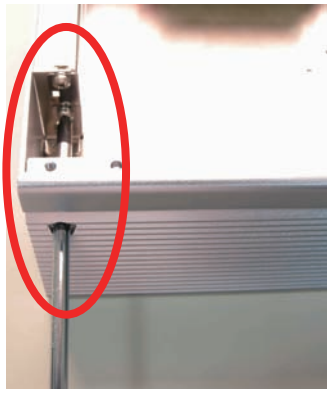
3.3.3 Installing PCI Card

1. Use a crosshead screwdriver to loose the screw that secure the expansion slot bracket. And then you can install a PCI card to this expanxion slot.



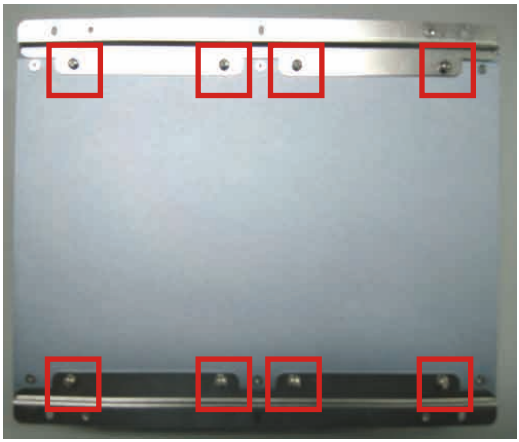
2. If you want to install the PCI card to the lower slot, please push the rubber cover out of the unit and, through the hole, use the screwdriver to loose the screw securing the lower expansion slot bracket.





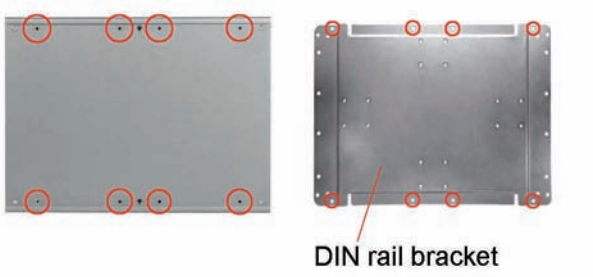
3.4 Wall Mounting (Optional)

1. Place the main unit upside down on a flat surface and locate the 8 screw holes on the bottom cover.
2. Place the wall-mount brackets horizontally along with bottom cover so that the screw holes are aligned with the ones of the bottom cover.
3. Secure the brackets to the main unit with the accompanying screws.



3.5 DIN Rail Mounting (Optional)

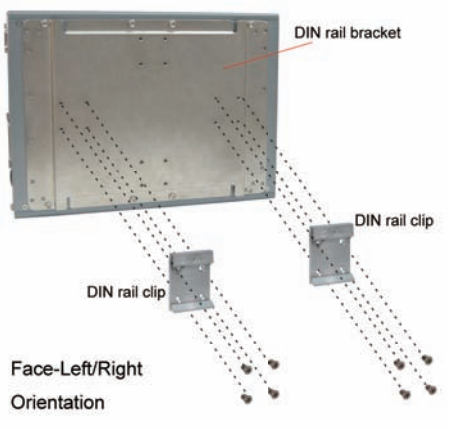
1. Please use the accompanying DIN rail kit to mount your computer to a standard DIN rail.
2. Place the main unit upside down on a flat surface and locate the 8 screw holes on the bottom cover.
3. As the figure shown below, align the screw holes of the DIN rail bracket with the ones of the main unit. Use the screwdriver to secure the bracket to the main unit with the accompanying screws.

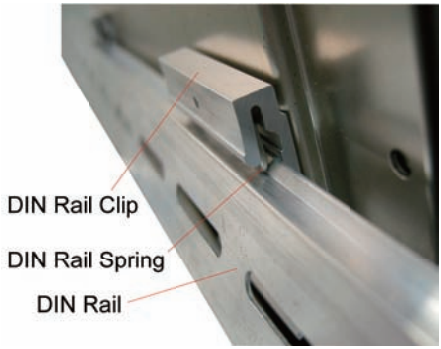


4. You can mount the BOX PC on a DIN rail in the horizontal or vertical direction.
5. Fasten a pair of DIN rail clips to the DIN rail bracket which was attached to the main unit. Please refer to the following figures for horizontal and vertical orientation mounting.

3.5.1 Face-Left/Right DIN Rail Mounting

1. For panel face-left/right mounting, please secure the two DIN rail clips to the DIN rail bracket according to the illustration.



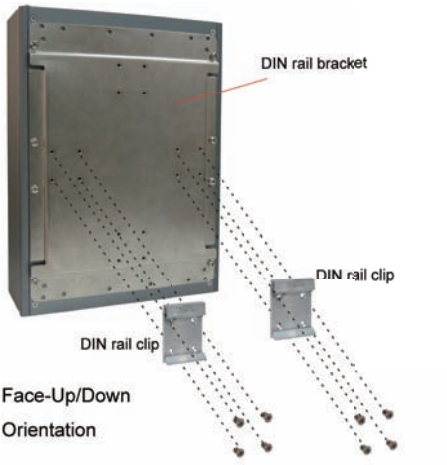


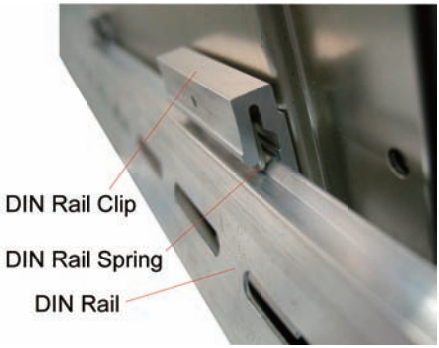
2. Position the bracket side of the box PC directly in front of the DIN rail. Make sure the top of the DIN rail clip hooks over the top of the DIN rail.

Box PC mounted on the DIN rail

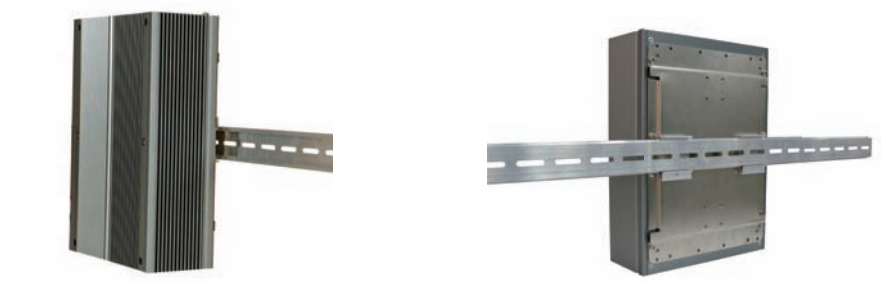
3.5.2 Face-Up/Down DIN Rail Mounting

1. For panel face-up/down mounting, please secure the two DIN rail clips to the DIN rail bracket according to the illustration.





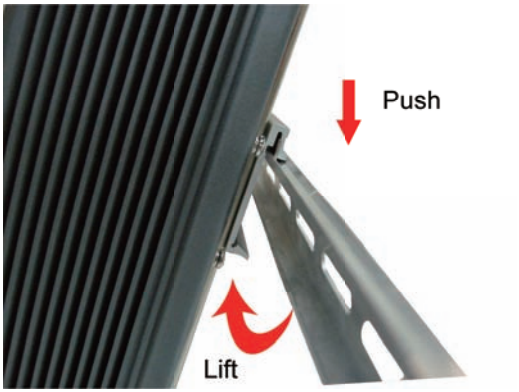
2. Position the bracket side of the box PC directly in front of the DIN rail. Make sure the top of the DIN rail clip hooks over the top of the DIN rail.



Box PC mounted on the DIN rail

3.5.3 Removing the Box PC from the DIN Rail

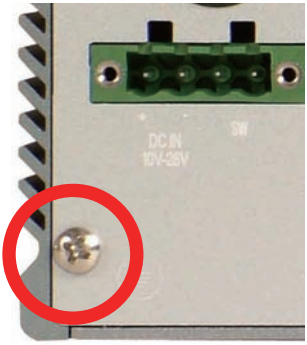
1. Make sure that power is removed from the computer, and disconnect all cables from the computer.
2. Hold the Box PC in both hands and push downwards. As the clip releases, lift the bottom of Box PC slightly.



3.6 Grounding the Box PC

Follow the instructions below to ground the computer on the ground. Make sure to follow any grounding requirements at your site.

Warning When installing the unit, the ground connection must always be made first and disconnected last.



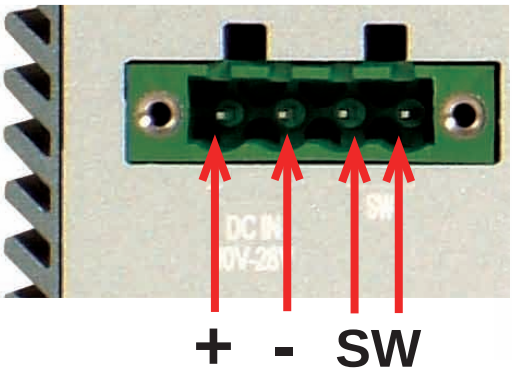
1. As the figure illustrates above, remove the ground screw located on the bottom left of the rear panel.
2. Attach the ground wire to the rear panel with the screw.

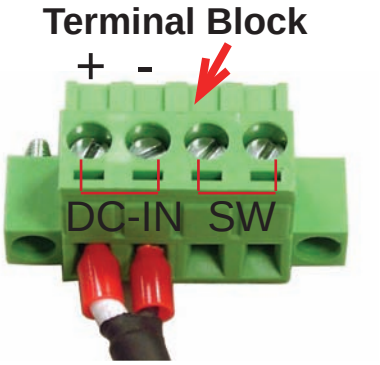
3.7 Wiring the DC-Input Power Source

Warning Only trained and qualified personnel should be allowed to install or replace this equipment.

Follow the instructions below for connecting the computer to a DC-input power source.

1. Before wiring, make sure the power source is disconnected.
2. Locate the terminal block that shipped in the accessory box with your computer.
3. Using the wire-stripping tool, strip a short piece of insulation from the output wires of the DC power source. The wire guage must be in the range between 14-22 AWG.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltage.
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.





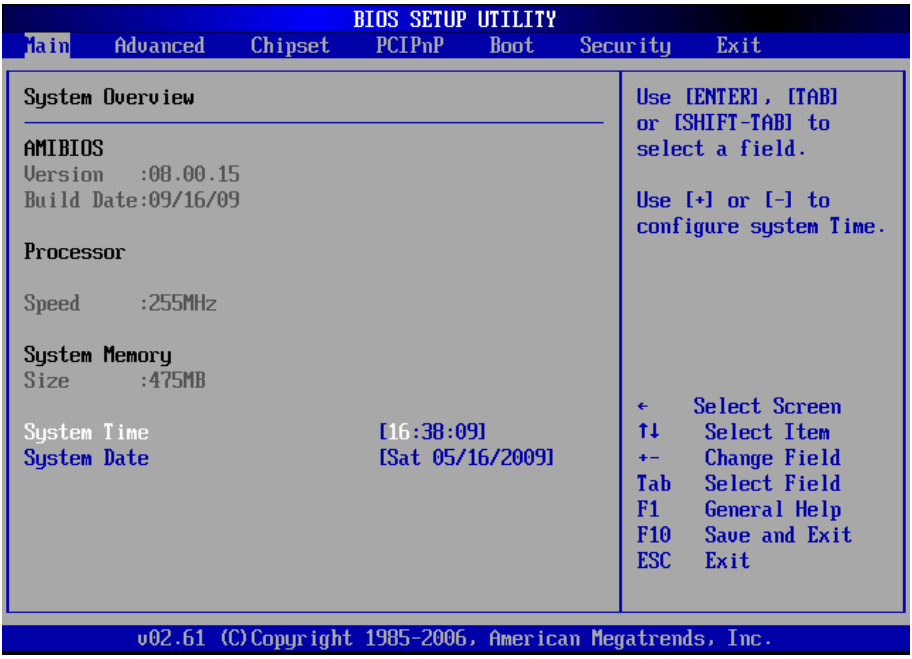
Chapter 4

BIOS

4.1 BIOS Main Setup

The AMI BIOS provides a setup utility program for specifying the system configurations and settings which are stored in the BIOS ROM of the system. When you turn on the computer, the AMI BIOS is immediately activated. After you have entered the setup utility, use the left/right arrow keys to highlight a particular configuration screen from the top menu bar or use the down arrow key to access and configure the information below.

NOTE: In order to increase system stability and performance, our engineering staff are constantly improving the BIOS menu. The BIOS setup screens and descriptions illustrated in this manual are for your reference only, and may not completely match what you see on your screen.



System Time

Set the system time.
The time format is:

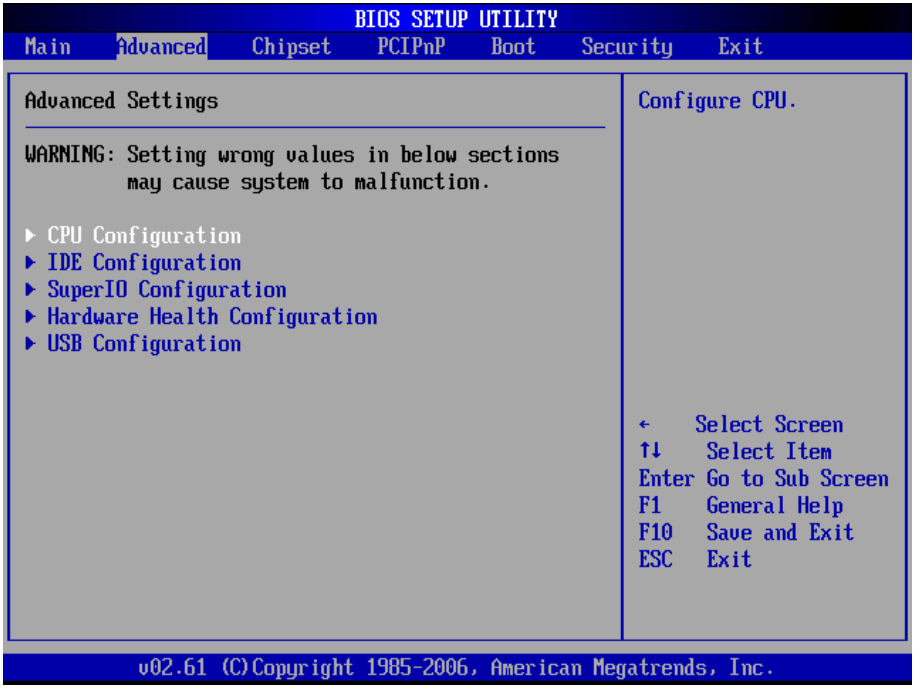
Hour : 00 to 23
Minute : 00 to 59
Second : 00 to 59

System Date

Set the system date. Note that the 'Day' automatically changes when you set the date.
The date format is:

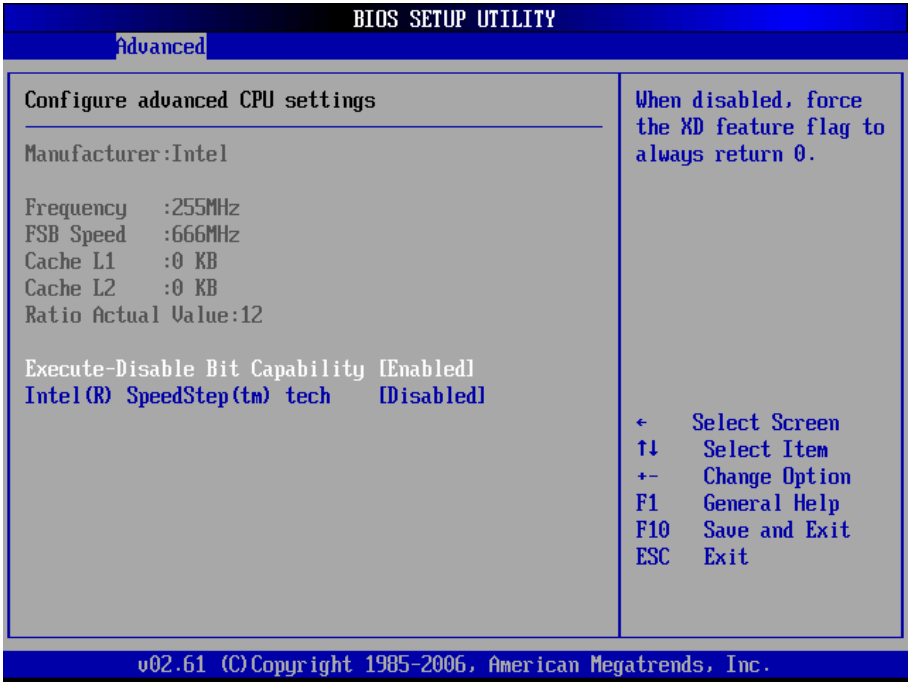
Day : Sun to Sat
Month : 1 to 12
Date : 1 to 31
Year : 1999 to 2099

4.2 Advanced Settings



4.2.1 CPU Configuration

The CPU Configuration setup screen varies depending on the installed processor.



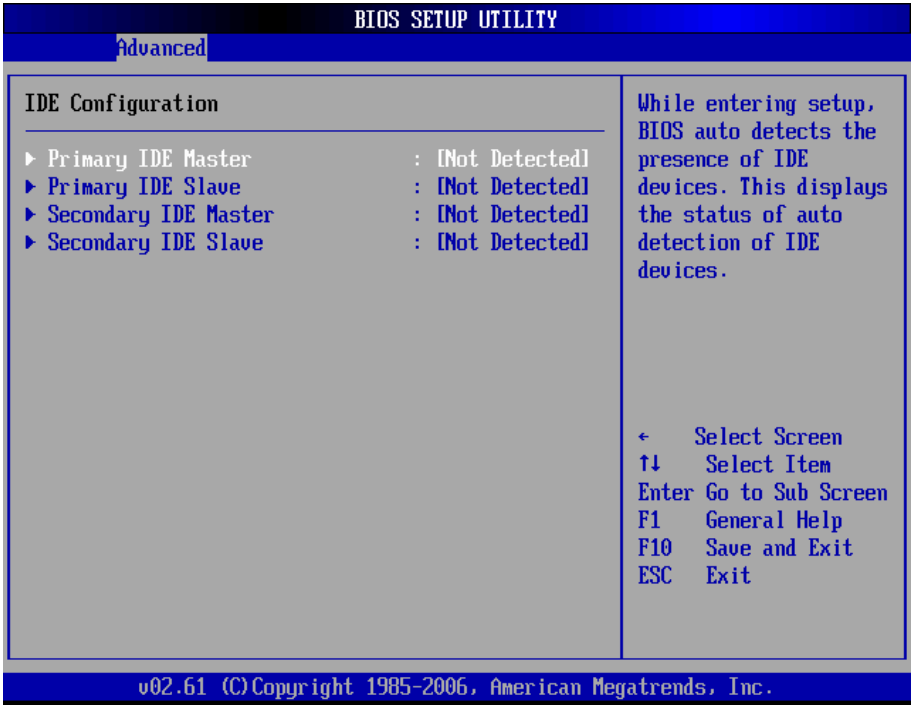
Execute-Disable Bit Capability

This item is a toggle to enable or disable the processor's Execute Disable Bit feature.
When enabled, the processor prevents the execution of code in data-only memory pages. This provides some protection against buffer overflow attacks.
When disabled, the processor will not restrict code execution in any memory area. This makes the processor more vulnerable to buffer overflow attacks.

Intel® SpeedStep™ Tech

Maximum: CPU speed is set to maximum.
Minimum: CPU speed is set to minimum.
Automatic: CPU speed controlled by Operating system.
Disabled: Default CPU speed.

4.2.2 IDE Configuration


BIOS SETUP UTILITY
Advanced
IDE Configuration
Primary IDE Master : [Not Detected]
Primary IDE Slave : [Not Detected]
Secondary IDE Master : [Not Detected]
Secondary IDE Slave : [Not Detected]
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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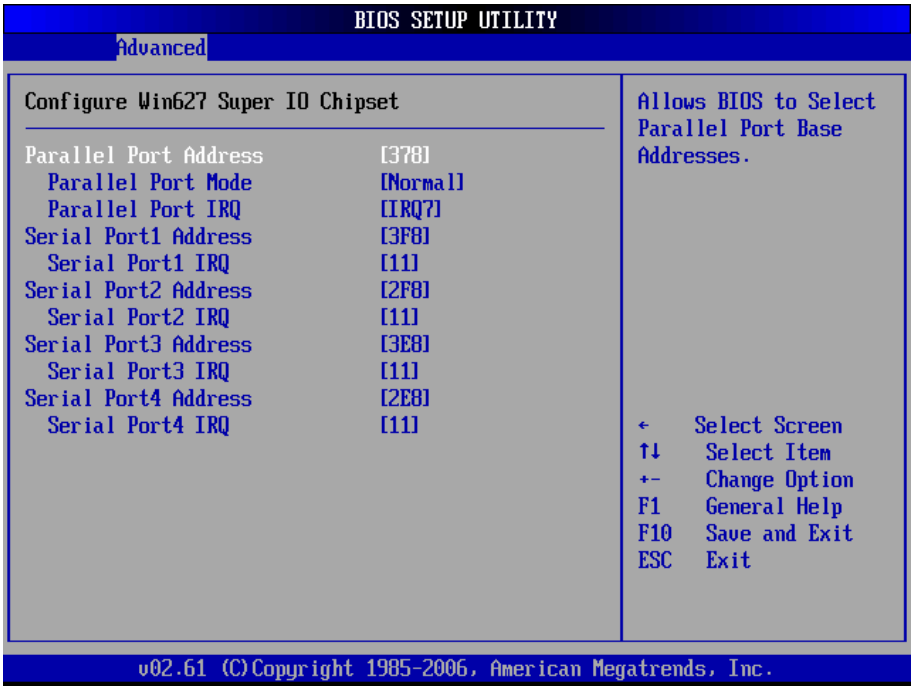
Primary IDE Master/Slave

Select one of the hard disk drives to configure it. Press <Enter> to access its submenu.

Secondary IDE Master/Slave

Select one of the hard disk drives to configure it. Press <Enter> to access its submenu.

4.2.3 Super IO Configuration



Parallel Port Address

Select an address for the parallel port.
The options:

- 3BC
- 378
- 278
- Disabled

Parallel Port Mode

Select an operating mode for the onboard parallel port.
The options:

- SPP, EPP, ECP, ECP + EPP, Normal

Parallel Port IRQ

Select an interrupt for the parallel port.
The options:

IRQ5
IRQ7

Serial Port1 / Port2 / Port3 / Port4 Address

Select an address and corresponding interrupt for the first and second serial ports.
The options:

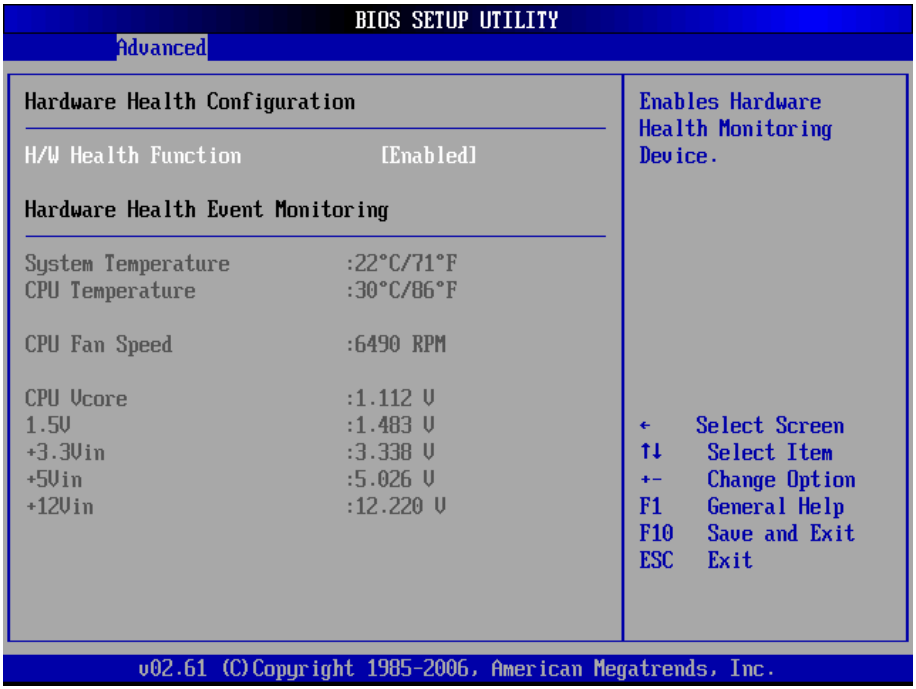
3F8/IRQ4
2E8/IRQ3
3E8/IRQ4
2F8/IRQ3
Disabled
Auto

Serial Port1 / Port2 / Port3 / Port4 IRQ

Select an interrupt for the first and second serial ports.
The options:

3F8/IRQ4
2E8/IRQ3
3E8/IRQ4
2F8/IRQ3
Disabled
Auto

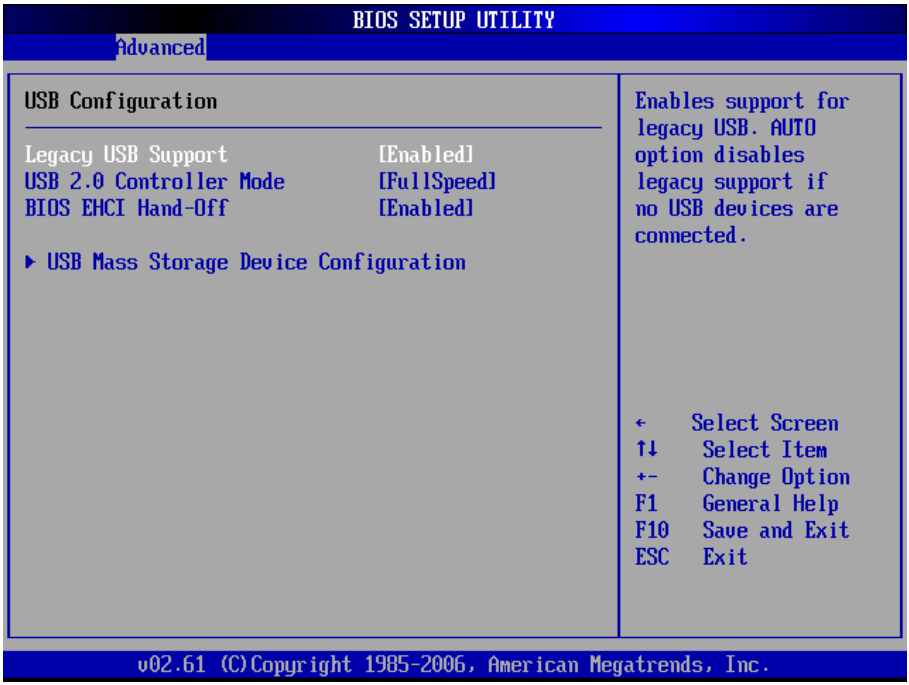
4.2.4 Hardware Health Configuration



H/W Health Configuration

This item allows you to enable/disable the hardware health monitoring device.

4.2.6 USB Configuration


BIOS SETUP UTILITY
Advanced
USB Configuration
Legacy USB Support [Enabled]
USB 2.0 Controller Mode [FullSpeed]
BIOS EHCI Hand-Off [Enabled]
▶ USB Mass Storage Device Configuration
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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Legacy USB Support

Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.

USB 2.0 Controller Mode

Configures the USB 2.0 controller in High Speed (480Mbps) or Full Speed (12MBPS).

BIOS EHCI Hand-Off

Allows you to enable support for operating systems without an EHCI hand-off feature. Configuration options: [Disabled] [Enabled]
Do not disable the BIOS EHCI Hand-Off option if you are running a Windows® operating system with USB device.

USB Mass Storage Device Configuration

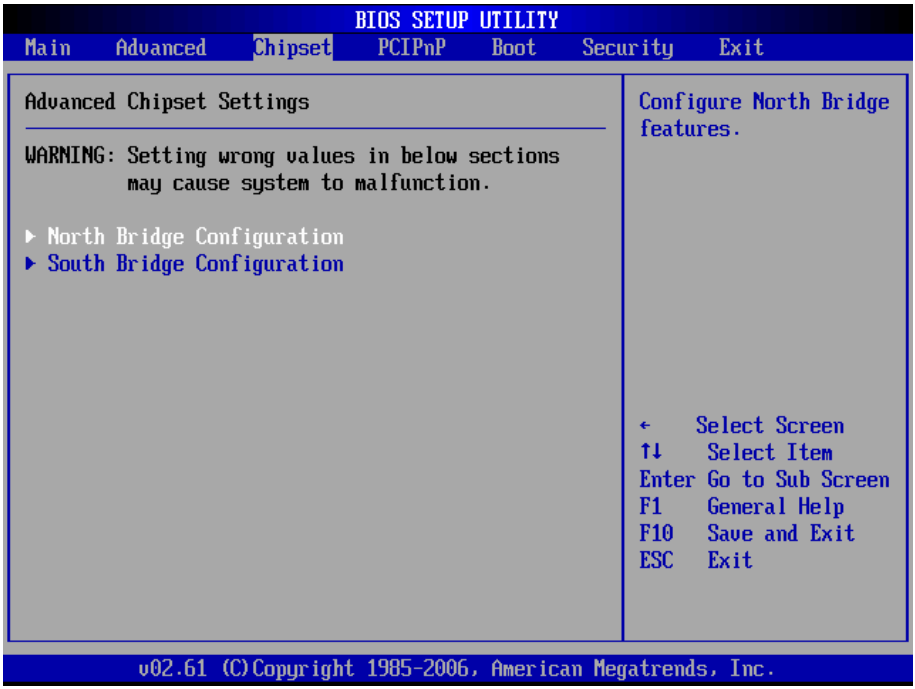
This item displays information when USB devices detected.

4.3 Chipset Settings

This submenu allows you to configure the specific features of the chipset installed on your system. The chipset manage bus speeds and access to system memory resources, such as DRAM. It also coordinates communications with the PCI bus.

Notice

Beware of that setting inappropriate values in items of this menu may cause system to malfunction.


BIOS SETUP UTILITY
Main Advanced Chipset PCIPnP Boot Security Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
North Bridge Configuration
South Bridge Configuration
Configure North Bridge features.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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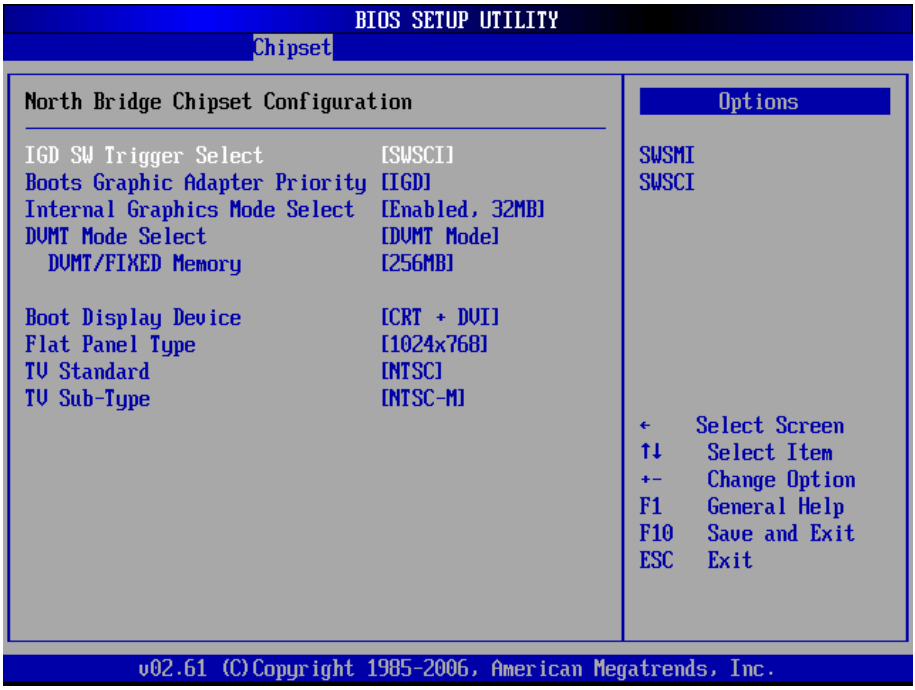
4.3.1 North Bridge Configuration



IGD SW Trigger Select

This item allows you to switch between SWSCI and SWSMI.

Boots Graphic Adapter Priority

Select which graphics controller to use as the primary boot device.

Internal Graphics Mode Select

This setting allows you to select the amount of system memory that is allocated to the integrated graphics processor when the system boots up.
The options: Enabled, 8MB (Default) / Enabled,1MB / Disabled

DVMT Mode Select

When Dynamic Video Memory Technology (DVMT) mode is selected, the system can dynamically allocate memory resources in accordance with the demands of the system and release back to the system once the requesting application has been terminated.
When Fixed mode is selected, the graphics driver will reserve a fixed portion of the system memory as graphics memory. The downside is once allocated, this memory cannot be used by the operating system even when it is not in use.
The options: DVMT Mode (Default), Fixed Mode, Combo Mode

DVMT/FIXED Memory

This setting allows you to set the maximum amount of system memory that can be allocated as graphics memory.
The options: 128MB (Default), 64MB, Maximum DVMT

Boot Display Device

This item allows you to select the display device.
The options: CRT (Default), TV

Flat Panel Type

This item allows you to select the type of LCD panel connected to the motherboard's built-in graphics chip.

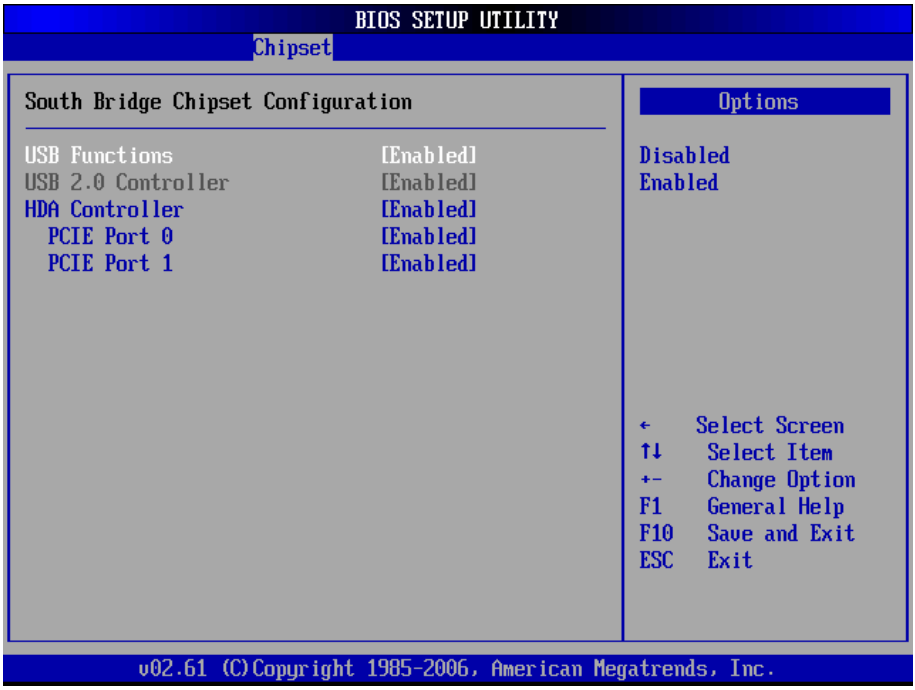
TV Standard

This item allows you to select the TV standard.
The options:
VBIOS-Default (Default), NTSC, PAL, SECAM, SMPTE240M, ITU-R television, SMPTE295M, SMPTE296M, EIA-770.2

TV Sub-Type

This item allows you to select the subtype of TV standard.

4.3.2 South Bridge Configuration



USB Funtions

The item determines the activation of USB port.

USB 2.0 Controller

If your system contains a Universal Serial Bus 2.0 (USB 2.0) controller and you have USB peripherals, please enable this function.
The options: Enabled (Default), Disabled

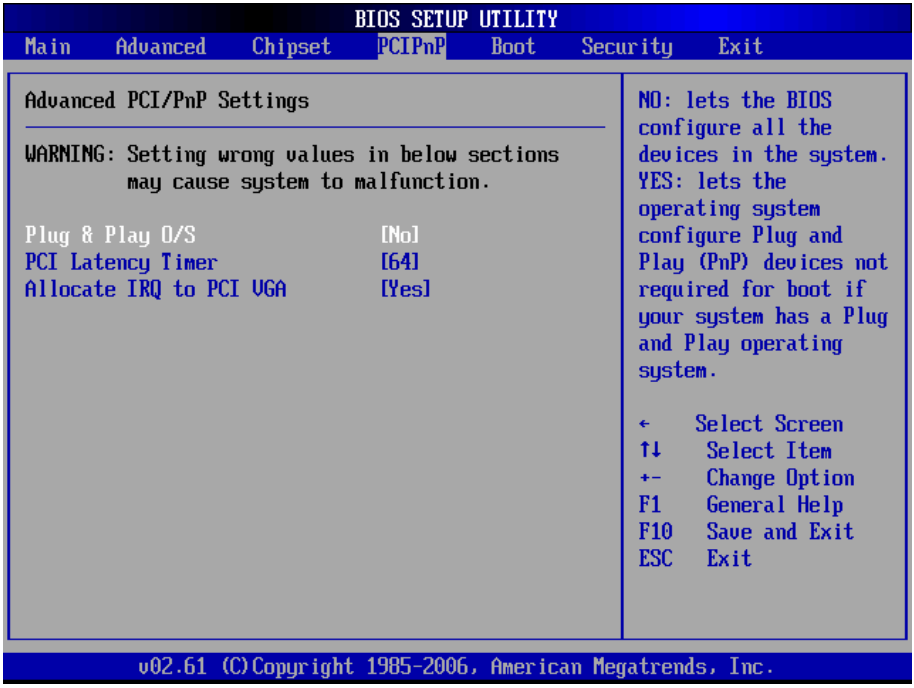
HDA Controller

This item allows you to enable/disable High Definition Audio Controller.
The options: Enabled (Default), Disabled

PCIE Port 0/PCIE Port 1

These items allow you to enable/disable the PCI-E ports.
The options: Enabled (Default), Disabled

4.4 PCIPnP Settings


BIOS SETUP UTILITY
Main Advanced Chipset PCIPnP Boot Security Exit
Advanced PCI/PnP Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
Plug & Play O/S [No]
PCI Latency Timer [64]
Allocate IRQ to PCI VGA [Yes]
NO: lets the BIOS configure all the devices in the system. YES: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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Plug & Play O/S

When set to YES, BIOS will only initialize the PnP cards used for the boot sequence (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Window™ 95. When set to NO, BIOS will initialize all the PnP cards. For non-PnP operating systems (DOS, Netware™), this option must set to NO.
The options: No (Default), Yes

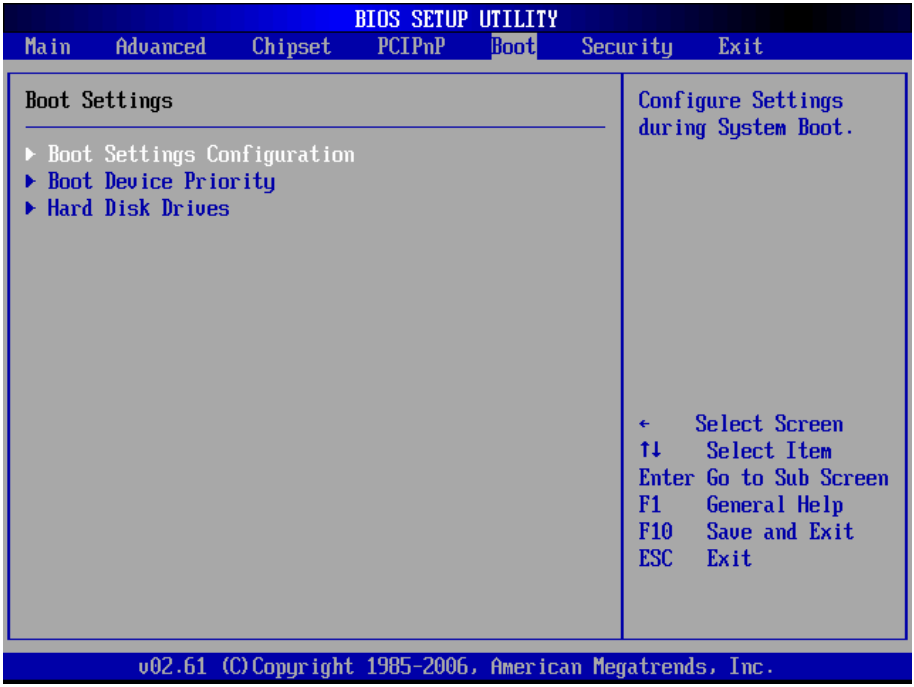
PCI Latency Timer

This item controls how long a PCI device can hold the PCI bus before another takes over. The longer the latency, the longer the PCI device can retain control of the bus before handing it over to another PCI device.
The options: 64 (Default), 32, 96, 128, 160, 192, 224, 248

Allocate IRQ to PCI VGA

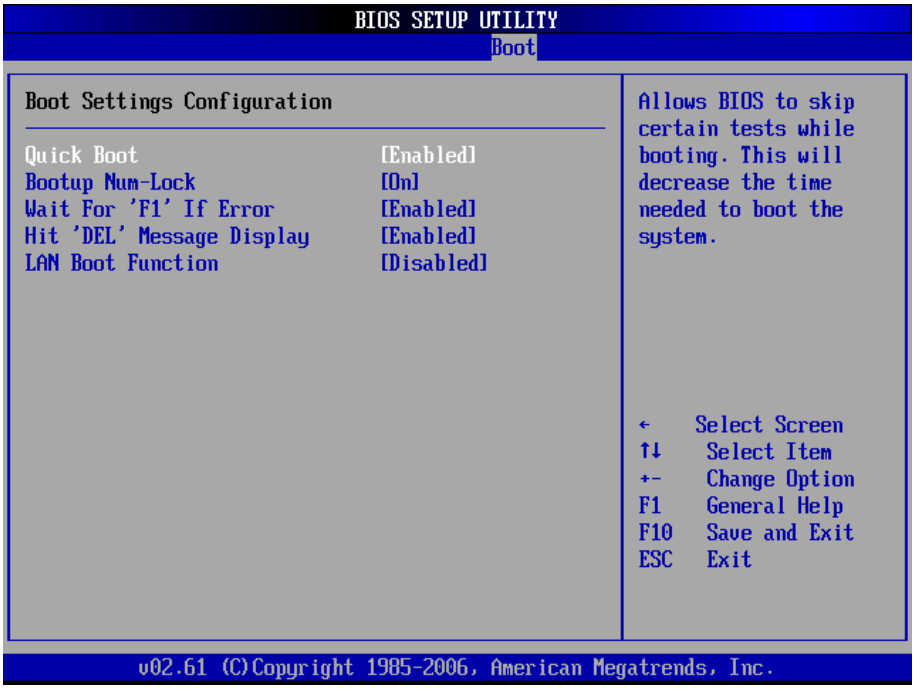
This item allows BIOS to choose an IRQ to assign for the PCI VGA card.
The options: Yes (Default), No

4.5 Boot Settings



The Boot menu items allow you to change the system boot options. Select an item then press the Enter key to access the sub-menu.

4.5.1 Boot Settings Configuration


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Bootup Num-Lock [On]
Wait For 'F1' If Error [Enabled]
Hit 'DEL' Message Display [Enabled]
LAN Boot Function [Disabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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Quick Boot

During the power on self test, the BIOS checks the hardware devices and counts the system memory. But all of these system tests are needed every time you boot, and can be turned off to save time. Enable this setting to turn those tests which are not needed.

Bootup Num-Lock

This setting determines whether the Num Lock key should be activated at boot up.

Wait For 'F1' If Error

When enabled, the BIOS will halt the boot sequence when an error is detected. Users will need to press the F1 button to enter the BIOS setup menu where users can adjust the settings to fix the problem. When disabled, the BIOS will not halt the boot sequence, even when an error is detected.

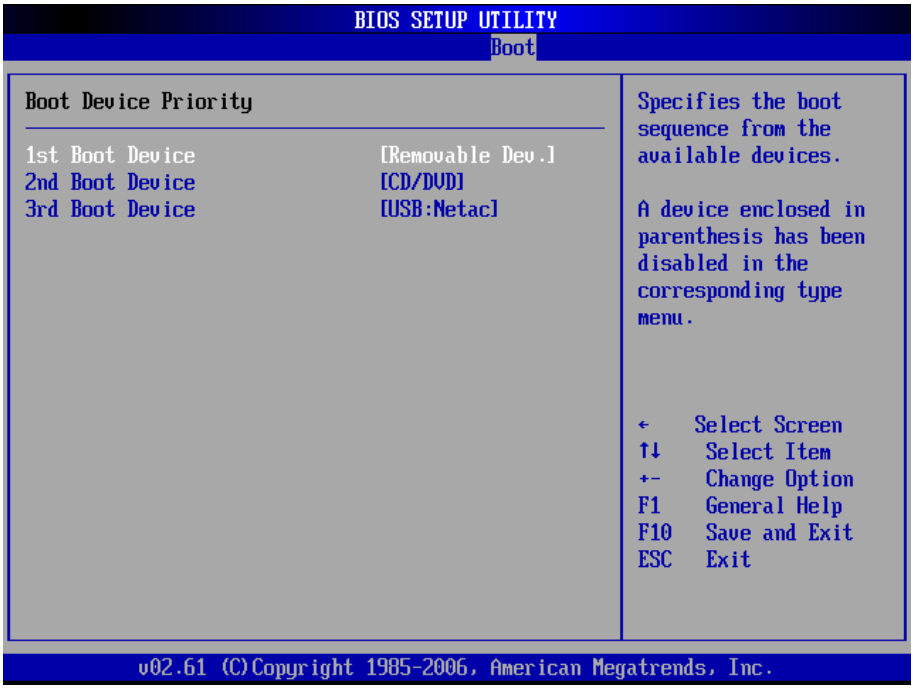
Hit 'DEL' Message Display

This setting determines whether the ***Hit "DEL" to enter Setup*** message is displayed during memory initialization.
When enabled, the ***Hit "DEL" to enter Setup*** message will shows up. When disabled, the message will not shows up.

LAN Boot Function

This setting allows you to enable/disable the LAN controller's boot ROM.

4.5.2 Boot Device Priority


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device [Removable Dev.]
2nd Boot Device [CD/DVD]
3rd Boot Device [USB:Metac]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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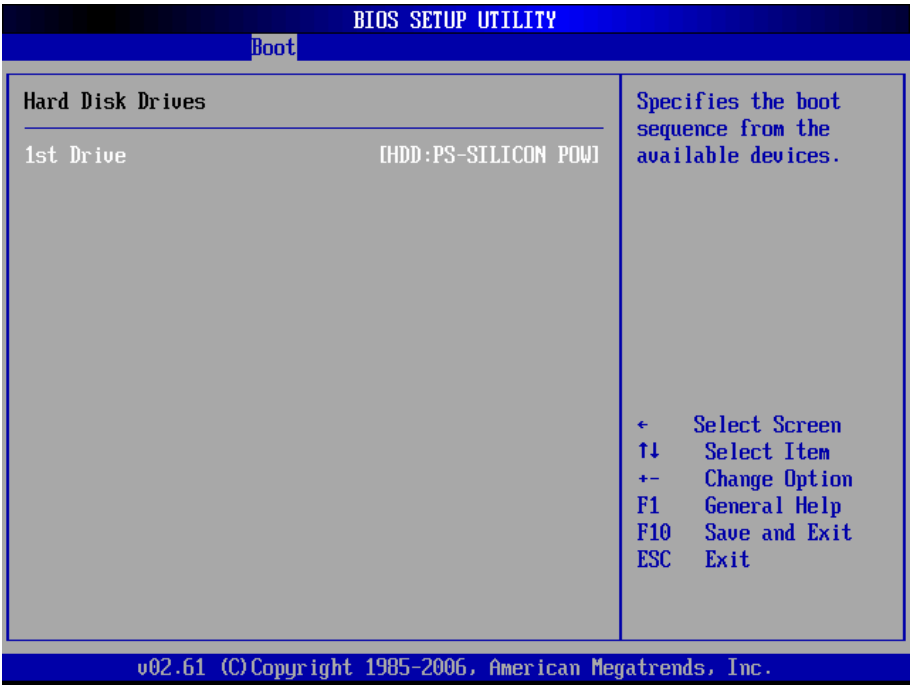
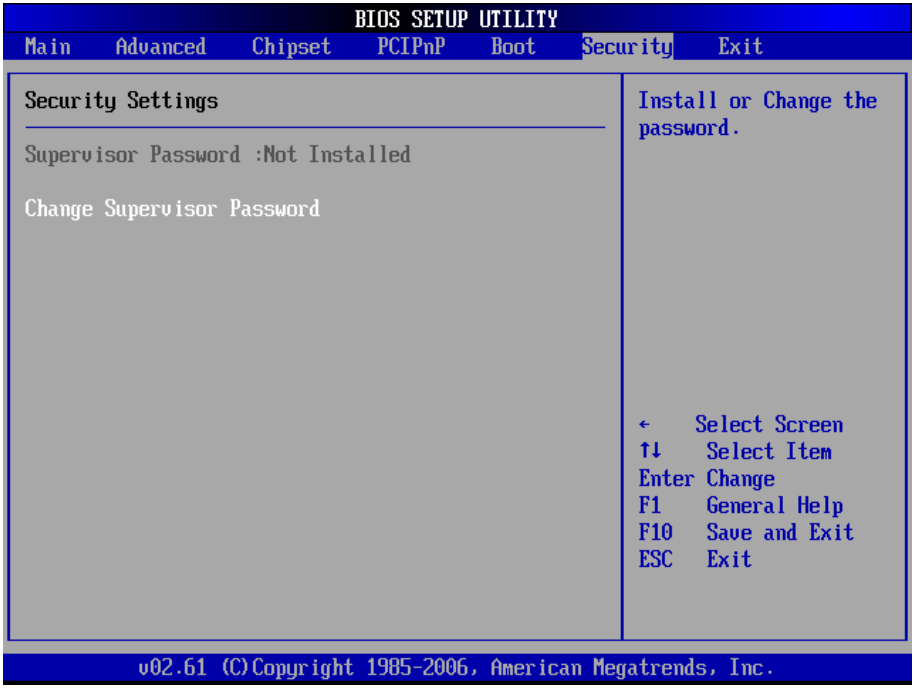
Items in this sub-menu specify the boot device priority from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

4.5.3 Hard Disk Drives



The BIOS will attempt to arrange the hard disk boot sequence automatically. You can also change the booting sequence. The number of device items that appears on the screen depends on the number of devices installed in the system.

4.6 Security



Supervisor Password

Set **Change Supervisor Password** to enter and change the options of the setup menus. When you enter this function, the following message will appear at the center of the screen to assist you in creating a password.

Enter New Password:

Type the password, up to six characters in length, and press <Enter>. The password typed now will substitute for any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <ESC> to abort the selection and not enter a password.

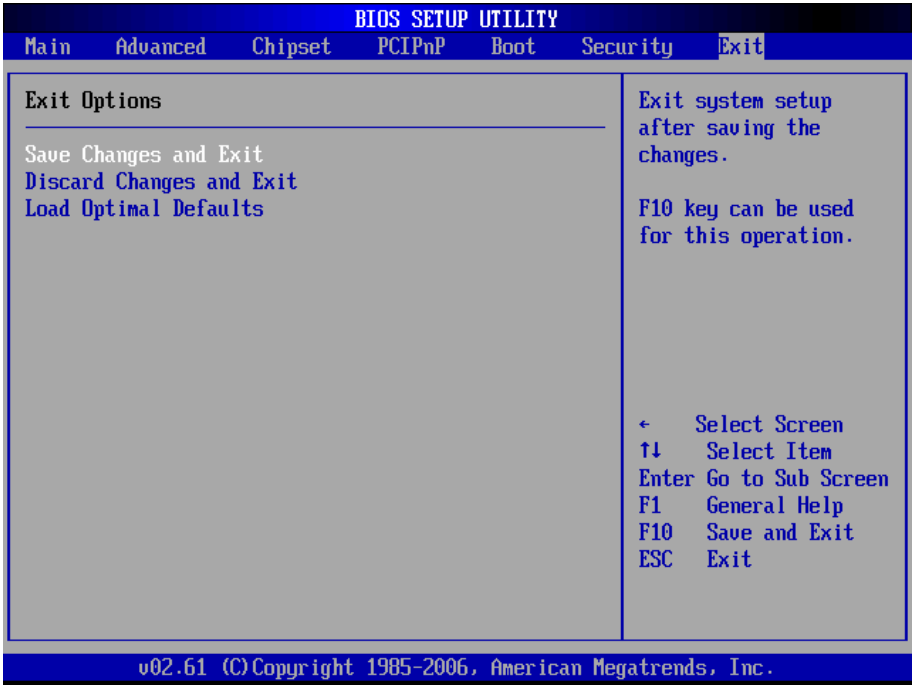
With a password enabled, a Password Check item appears. Set this item to **Setup**, you will be prompted to enter the password every time you try to enter the BIOS Setup utility. This prevents an unauthorized person from changing any part of your system configuration.

You can also require the BIOS to request a password every time your system is rebooted by setting it to **Always**. This would prevent unauthorized use of your computer.

To clear a password, just leave the field blank and press <Enter> when you are prompted to enter a new password. Once the password is cleared, the following message will appear at the center of the screen.

Password Uninstalled.

4.7 Exit Options


BIOS SETUP UTILITY
Main Advanced Chipset PCIPnP Boot Security Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Load Optimal Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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Save Changes and Exit

Pressing <Enter> on this item and it asks for confirmation:

Save configuration changes and exit setup?

Pressing <OK> stores the selection made in the menus in CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Discard Changes and Exit

Exit system setup without saving any changes.
<ESC> key can be used for this operation.

Load Optimal Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message:

Load Optimal Defaults?
[OK] [Cancel]

Pressing [OK] loads the BIOS Optimal Default values for all the setup questions.

<F9> key can be used for this operation.

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Chapter 5

Appendix

5.1 I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.
The following table lists the I/O port addresses used.

Address	Device Description
00000000 - 0000000F	DMA Controller
00000000 - 00000CF7	PCI bus
00000010 - 0000001F	Motherboard resources
00000020 - 00000021	Programmable interrupt controller
00000022 - 0000003F	Motherboard resources
00000040 - 00000043	System Timer
00000044 - 0000005F	Motherboard resources
00000060 - 00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000061 - 00000061	System speaker
00000062 - 00000063	Motherboard resources
00000064 - 00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000065 - 0000006F	Motherboard resources
00000070 - 00000071	System CMOS/real time clock
00000072 - 0000007F	Motherboard resources
00000080 - 00000080	Motherboard resources
00000081 - 00000083	Direct memory access controller
00000084 - 00000086	Motherboard resources
00000087 - 00000087	Direct memory access controller
00000088 - 00000088	Motherboard resources
00000089 - 0000008B	Direct memory access controller
0000008C - 0000008E	Motherboard resources
0000008F - 0000008F	Direct memory access controller
00000090 - 0000009F	Motherboard resources
000000A0 - 000000A1	Programmable interrupt controller

000000A2 - 000000BF	Motherboard resources
000000C0 - 000000DF	Direct memory access controller
000000E0 - 000000EF	Motherboard resources
000000F0 - 000000FF	Numeric data processor
00000170 - 00000177	Secondary IDE Channel
000001F0 - 000001F7	Primary IDE Channel
00000274 - 00000277	ISAPNP Read Data Port
00000279 - 00000279	ISAPNP Read Data Port
000002E8 - 000002EF	Communications Port (COM4)
000002F8 - 000002FF	Communications Port (COM2)
00000376 - 00000376	Secondary IDE Channel
00000378 - 0000037F	Printer Port (LPT1)
000003B0 - 000003BB	Mobile Intel® 4 Series Express Chipset Family
000003C0 - 000003DF	Mobile Intel® 4 Series Express Chipset Family
000003E8 - 000003EF	Communications Port (COM3)
000003F6 - 000003F6	Primary IDE Channel
000003F8 - 000003FF	Communications Port (COM1)
00000400 - 0000041F	Intel® ICH9 Family SMBus Controller - 2930
000004D0 - 000004D1	Motherboard resources
00000500 - 0000057F	Motherboard resources
00000800 - 0000087F	Motherboard resources
00000A00 - 00000A0F	Motherboard resources
00000A60 - 00000A6F	Motherboard resources
00000A79 - 00000A79	ISAPNP Read Data Port
00000D00 - 0000FFFF	PCI bus
0000A000 - 0000A007	Mobile Intel® 4 Series Express Chipset Family
0000A080 - 0000A09F	Intel® ICH9 Family USB Universal Host Controller - 2939
0000A400 - 0000A41F	Intel® ICH9 Family USB Universal Host Controller - 2938
0000A480 - 0000A49F	Intel® ICH9 Family USB Universal Host Controller - 2937

0000A800 - 0000A81F	Intel® ICH9 Family USB Universal Host Controller - 2936
0000A880 - 0000A89F	Intel® ICH9 Family USB Universal Host Controller - 2935
0000AC00 - 0000AC1F	Intel® ICH9 Family USB Universal Host Controller - 2934
0000B000 - 0000B00F	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000B080 - 0000B08F	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000B400 - 0000B403	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000B480 - 0000B487	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000B800 - 0000B803	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000B880 - 0000B887	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
0000C000 - 0000CFFF	Intel® ICH9 Family PCI Express Root Port 1 - 2940
0000C800 - 0000C8FF	Realtek PCIe GBE Family Controller
0000D000 - 0000DFFF	Intel® ICH9 Family PCI Express Root Port 2 - 2942
0000D800 - 0000D8FF	Realtek PCIe GBE Family Controller #2
0000E000 - 0000EFFF	Intel® ICH9 Family PCI Express Root Port 4 - 2946
0000E400 - 0000E40F	Standard Dual Channel PCI IDE Controller
0000E480 - 0000E483	Standard Dual Channel PCI IDE Controller
0000E800 - 0000E807	Standard Dual Channel PCI IDE Controller
0000E880 - 0000E883	Standard Dual Channel PCI IDE Controller
0000EC00 - 0000EC07	Standard Dual Channel PCI IDE Controller
0000FF90 - 0000FF9F	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 1 - 2928
0000FFA0 - 0000FFAF	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 1 - 2928

5.2 Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 0	System Timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 4	Intel® ICH9 Family SMBus Controller - 2930
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 11	Communications Port (COM1/COM2/COM3/COM4)
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	Secondary IDE Channel
IRQ 16	Intel® ICH9 Family PCI Express Root Port 2 - 2942
	Intel® ICH9 Family USB Universal Host Controller - 2937
	Mobile Intel® 4 Series Express Chipset Family
	Realtek PCIe GBE Family Controller
IRQ 17	Intel® ICH9 Family PCI Express Root Port 1 - 2940
	Realtek PCIe GBE Family Controller #2
IRQ 18	Intel® ICH9 Family USB Universal Host Controller - 2936
	Intel® ICH9 Family USB2 Enhanced Host Controller - 293C
IRQ 19	Intel® ICH9 Family PCI Express Root Port 4 - 2946
	Intel® ICH9 Family USB Universal Host Controller - 2939
	Intel® ICH9 Family USB Universal Host Controller - 2935
	Intel® ICH9M/M-E 2 port Serial ATA Storage Controller 2 - 292D
	Standard Dual Channel PCI IDE Controller
IRQ 21	Intel® ICH9 Family USB Universal Host Controller - 2938
IRQ 22	Microsoft UAA Bus Driver for High Definition Audio
IRQ 23	Intel® ICH9 Family USB Universal Host Controller - 2934
	Intel® ICH9 Family USB2 Enhanced Host Controller - 293A

5.3 Memory Mapping

Address	Device Description
00000000 - 0009FFFF	System board
000A0000 - 000BFFFF	Mobile Intel® 4 Series Express Chipset Family
000A0000 - 000BFFFF	PCI bus
000C0000 - 000CFFFF	System board
000D0000 - 000DFFFF	PCI bus
000E0000 - 000DFFFF	System board
00100000 - 7DBFFFFF	System board
7DC00000 - DFFFFFFF	PCI bus
D0000000 - DFFFFFFF	Mobile Intel® 4 Series Express Chipset Family
E0000000 - EFFFFFFF	Motherboard resources
F0000000 - FED8FFFF	PCI bus
FDE00000 - FDEFFFFF	Intel® ICH9 Family PCI Express Root Port 1 - 2940
FDEF0000 - FDEFFFFF	Realtek PCIe GBE Family Controller
FDF00000 - FDFFFFFF	Intel® ICH9 Family PCI Express Root Port 2 - 2942
FDFF0000 - FDFFFFFF	Realtek PCIe GBE Family Controller #2
FE300000 - FE3FFFFF	Mobile Intel® 4 Series Express Chipset Family
FE400000 - FE7FFFFF	Mobile Intel® 4 Series Express Chipset Family
FE8F8000 - FE8FBFFF	Microsoft UAA Bus Driver for High Definition Audio
FE8FF400 - FE8FF7FF	Intel® ICH9 Family USB2 Enhanced Host Controller - 293C
FE8FF800 - FE8FFBFF	Intel® ICH9 Family USB2 Enhanced Host Controller - 293A
FE8FFC00 - FE8FFCFF	Intel® ICH9 Family SMBus Controller - 2930
FE900000 - FE9FFFFF	Intel® ICH9 Family PCI Express Root Port 1 - 2940
FE9FF000 - FE9FFFFF	Realtek PCIe GBE Family Controller
FEA00000 - FEAFFFFF	Intel® ICH9 Family PCI Express Root Port 2 - 2942

FEAFF000 - FEAFFFFF	Realtek PCIe GBE Family Controller #2
FEB00000 - FEBFFFFF	Intel® ICH9 Family PCI Express Root Port 4 - 2946
FEC00000 - FEC00FFF	Motherboard resources
FED00000 - FED003FF	High precision event timer
FED10000 - FED19FFF	Motherboard resources
FED1C000 - FED1FFFF	Motherboard resources
FED20000 - FED3FFFF	Motherboard resources
FED40000 - FED8FFFF	Motherboard resources
FED90000 - FFFFFFFF	System board
FEE00000 - FEE00FFF	Motherboard resources
FFB00000 - FFBFFFFF	Intel® 82802 Firmware Hub Device
FFC00000 - FFEFFFFF	Motherboard resources
FFF00000 - FFFFFFFF	Intel® 82802 Firmware Hub Device

5.4 Digital I/O Setting

Digital I/O can read from or write to a line or an entire digital port, which is a collection of lines. This mechanism can be used to meet user's various applications such as industrial automation, customized circuit, and laboratory testing. The source code below written in assembly & C is the applicable sample for programming.

5.4.1 Source Code in Assembly

```
;
;  SMBus base address : 0400h
;
;  F75111R device index address: 6eh
;
; For more detail information, please refer to Intel datasheet
; & Fintek datasheet.

;Set I/O Group1
        mov     ax,0402h
        mov     dx,ax
        mov     ax,ffh
        out     dx,al           ; clear smbus

        mov     ax,0400h
        mov     dx,ax
        mov     ax,00h
        out     dx,al           ; clear smbus status

        mov     ax,0404h
        mov     dx,ax
        mov     ax,6eh          ; write : Index address
        out     dx,al           ;

        mov     ax,0403h
        mov     dx,ax
        mov     ax,10h          ; Reg10h : Input/Output selecter
        out     dx,al           ;
```

```
        mov     ax,0405h
        mov     dx,ax
        mov     ax,0ffh         ; set I/O Group1 : 1=output ; 0=intput
        out     dx,al           ;

        mov     ax,0402h
        mov     dx,ax
        mov     ax,048h         ; start work
        out     dx,al           ;
;End of Set I/O Group1

;Set I/O Group1 value
        mov     ax,0402h
        mov     dx,ax
        mov     ax,ffh
        out     dx,al           ; clear smbus

        mov     ax,0400h
        mov     dx,ax
        mov     ax,00h
        out     dx,al           ; clear smbus status

        mov     ax,0404h
        mov     dx,ax
        mov     ax,6eh          ; write : Index address
        out     dx,al           ;

        mov     ax,0403h
        mov     dx,ax
        mov     ax,11h          ; Reg11h : Input/Output data regiser
        out     dx,al           ;

        mov     ax,0405h
        mov     dx,ax
        mov     ax,0ffh         ; set I/O Group1 all output hi
        out     dx,al           ;

        mov     ax,0402h
        mov     dx,ax
        mov     ax,048h         ; start work
```

```
        out     dx,al           ;
;End of Set I/O Group1 value


;Set I/O Group2
        mov     ax,0402h
        mov     dx,ax
        mov     ax,ffh
        out     dx,al           ; clear smbus

        mov     ax,0400h
        mov     dx,ax
        mov     ax,00h
        out     dx,al           ; clear smbus status

        mov     ax,0404h
        mov     dx,ax
        mov     ax,6eh          ; write : Index address
        out     dx,al           ;

        mov     ax,0403h
        mov     dx,ax
        mov     ax,20h          ; Reg20h : Input/Output selecter
        out     dx,al           ;

        mov     ax,0405h
        mov     dx,ax
        mov     ax,0ffh         ; set I/O Group2 : 1=output ; 0=intput
        out     dx,al           ;

        mov     ax,0402h
        mov     dx,ax
        mov     ax,048h         ; start
        out     dx,al           ;
;End of Set I/O Group2

;Set I/O Group2 value
        mov     ax,0402h
        mov     dx,ax
        mov     ax,ffh
```

```
        out     dx,al           ; clear smbus

        mov     ax,0400h
        mov     dx,ax
        mov     ax,00h
        out     dx,al           ; clear smbus status

        mov     ax,0404h
        mov     dx,ax
        mov     ax,6eh          ; write : Index address
        out     dx,al           ;

        mov     ax,0403h
        mov     dx,ax
        mov     ax,21h          ; Reg21h : Input/Output data register
        out     dx,al           ;

        mov     ax,0405h
        mov     dx,ax
        mov     ax,000h         ; set I/O Group2 all output low
        out     dx,al           ;

        mov     ax,0402h
        mov     dx,ax
        mov     ax,048h         ; start work
        out     dx,al           ;
;End of Set I/O Group2 Value
```

5.4.2 Source Code in C

```
/*-----     Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/*-----     routing, sub-routing -----*/
void main(int argc, char *argv[])
{
   int SMB_PORT_AD  = 0x400;
   int SMB_DEVICE_ADD = 0x6e;          /*75111R's Add=6eh */
   int i,j;

/*          Index 10, GPIO1x Output pin control      */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x10,0xff);
/* Set 1=output, 0=input */
   delay(500);
/*          Index 20, GPIO1x Output pin control      */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x20,0xff);
/* Set 1=output, 0=input */
   delay(10);

/*          Index 11, GPIO1x Output Data value       */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x11,0x00);
   delay(500);
/*          Index 21, GPIO1x Output Data value       */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x21,0x00);

   delay(3000);

/*          Index 11, GPIO1x Output Data value       */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x11,0xff);
   delay(500);
/*          Index 21, GPIO1x Output Data value       */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x21,0xff);

}
```

```
SMB_Byte_READ(int SMPORT, int DeviceID, int REG_INDEX)
{
  outportb(SMPORT+02, 0x00);              /* clear smbus*/
  outportb(SMPORT+00, 0xff);              /* clear smbus status */
  delay(10);
  outportb(SMPORT+04, DeviceID+1);        /* set device */
  outportb(SMPORT+03, REG_INDEX);         /* set device register */
  outportb(SMPORT+02, 0x48);              /* Starting read_byte */
  delay(10);
  data=inportb(SMPort+05);                /* get read data */
}

SMB_Byte_WRITE(int SMPORT, int DeviceID, int REG_INDEX, int REG_
DATA)
{
  outportb(SMPORT+02, 0x00);              /* clear smbus*/
  outportb(SMPORT+00, 0xff);              /* clear smbus status */
  delay(10);
  outportb(SMPORT+04, DeviceID);          /* set device */
  outportb(SMPORT+03, REG_INDEX);         /* set device register */
  outportb(SMPORT+05, REG_DATA);          /* set device data */
  outportb(SMPORT+02, 0x48);              /* Starting write byte */
  delay(10);
}
```

5.5 Watchdog Timer (WDT) Setting

WDT is widely applied to industry computers to monitor activities of CPU. The programmed application triggers WDT with adequate timer setting depending on its requirement. Before WDT counts down to zero, the functional system will reset the counter. In case the WDT counter is not reset by an abnormal system, it will counts down to zero and then reset the system automatically.

This computer supports the watchdog timer up to 255 levels for users for software programming. Below please take the source code written in assembly & C for a WDT application example.

5.5.1 Source Code in Assembly

```
mov     ax,2eh
mov     dx,ax
mov     ax,87h
out     dx,al
out     dx,al           ; initial IO port twice

mov     ax,2eh
mov     dx,ax
mov     al,07h          ; point to logical device selector
out     dx,al
inc     dx
mov     al,08h
out     dx,al           ; select logical device 8

mov     ax,2eh
mov     dx,ax
mov     al,30h          ; select CR30
out     dx,al
inc     dx
mov     al,01h
out     dx,al           ; update CR30 to 01h, WDTO enable

mov     ax,2eh
mov     dx,ax
mov     al,0f0h         ; select CRF0
```

```
out     dx,al
inc     dx
mov     al,00h
out     dx,al           ; update CRF0 bit3, 0:sec; 1:Min.

mov     ax,2eh
mov     dx,ax
mov     al,0f5h         ; select CRF5 to set timer unit
out     dx,al
inc     dx
mov     al,00h
out     dx,al           ; update CRF5 bit3, 0:sec; 1:Min.

mov     ax,2eh
mov     dx,ax
mov     al,0f6h         ; select CRF6
out     dx,al
inc     dx
mov     al,05h
out     dx,al           ; update CRF6 to 05h (5 sec)

mov     ax,2eh
mov     dx,ax
mov     ax,0aah
out     dx,al           ;stop program W83627HG, Exit
```

5.5.2 Source Code in C

```
/*                                      */
/* Winbond W83627HG Watch Dog Timer Demo Code */
/*                                      */
/*-----    Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/*-----    routing, sub-routing -----*/

void main()
{
        outportb(0x2e, 0x87);               /* initial IO port twice */
        outportb(0x2e, 0x87);

        outportb(0x2e, 0x07);           /* point to logical device selector */
        outportb(0x2e+1, 0x08);         /* select logical device 8 */
        outportb(0x2e, 0x30);           /* select CR30 */
        outportb(0x2e+1, 0x01);         /* update CR30 to 01h */
        outportb(0x2e, 0xf0);           /* select CRF0 */
        outportb(0x2e+1, 0x00);         /* update CRF0 to 00h */
        outportb(0x2e, 0xf5);           /* select CRF5 to set timer unit */
        outportb(0x2e+1, 0x00);         /* update CRF5 bit3, 0:sec; 1:Min. */
        outportb(0x2e, 0xF6);           /* select CRF6 */
        outportb(0x2e+1, 0x05);         /* update CRF6 to 05h (5 sec) */

        outportb(0x2e, 0xAA);           /* stop program W83627HG, Exit */

}
```